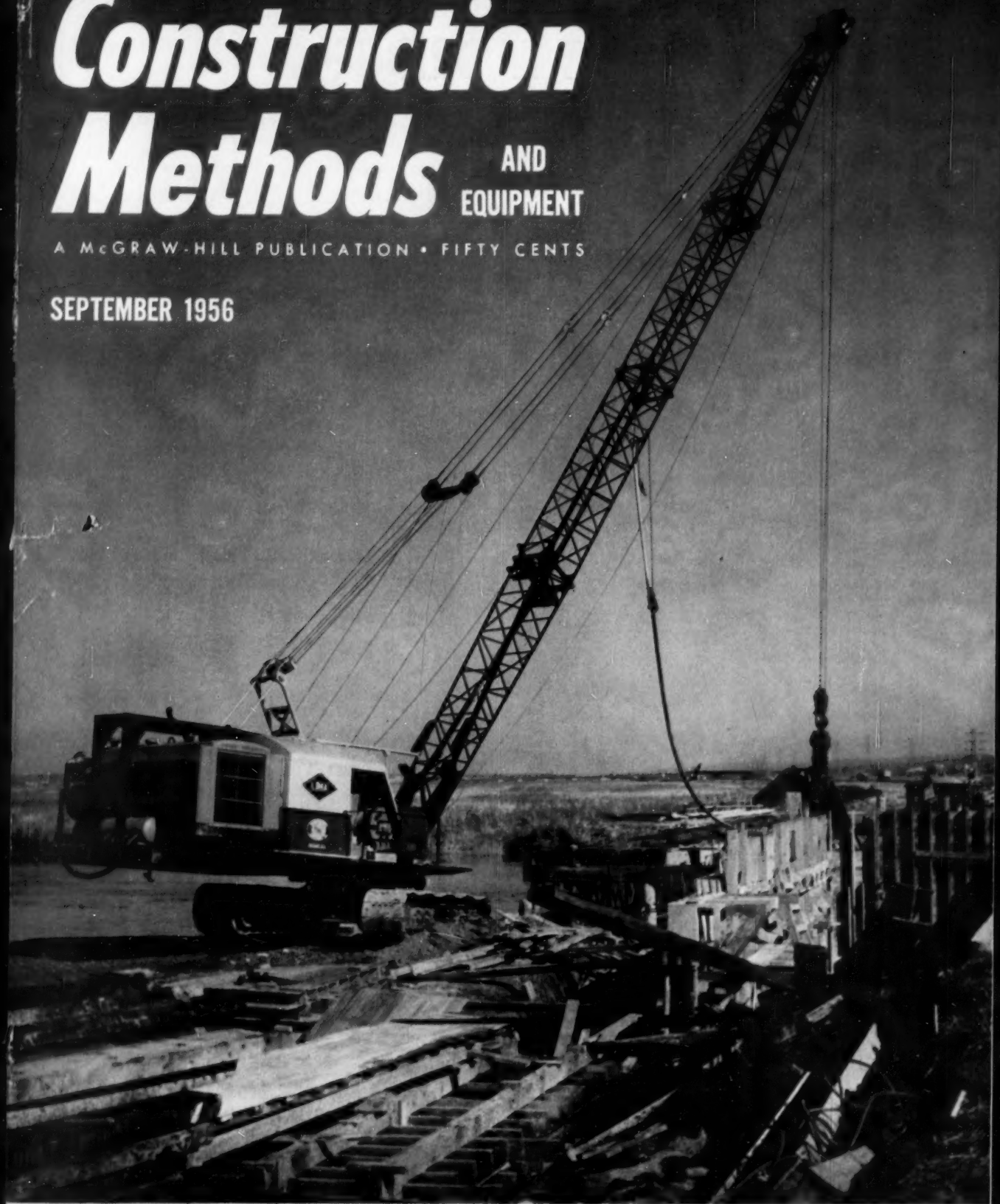
Construction Methods AND EQUIPMENT

A McGRAW-HILL PUBLICATION • FIFTY CENTS

SEPTEMBER 1956



In New Jersey, pile extractor powered by crane's piggy back compressor pulls cofferdam sheeting ..... p. 2

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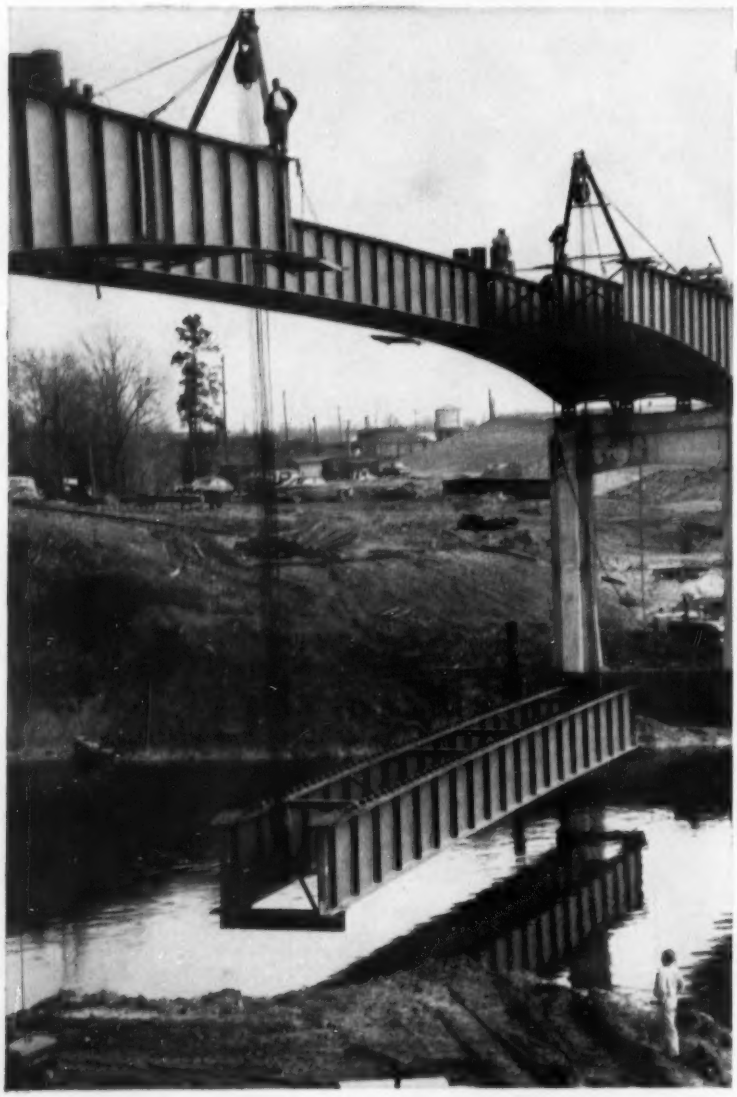
A SUPERHIGHWAY BRIDGE

. . . takes shape in Texas



Texas is moving at a rapid rate with modernization of its superhighway network. Hundreds of miles of smooth thoroughfares are being planned and constructed.

This bridge under construction will connect Houston via superhighway to Beaumont. Built by Elmer C. Gardner, Inc., Houston, Texas, the choice of wire rope to lift the heavy girders into place was Yellow Strand Wire Rope.

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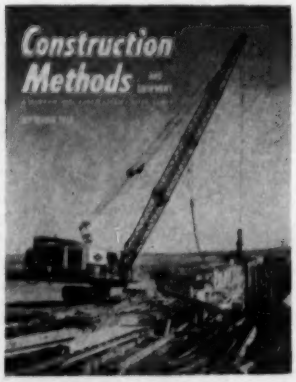

On the Cover

Carrying a Chicago Pneumatic 900-cfm rotary on the rear, and handling a McKiernan-Terry pile extractor, Union Building & Construction Co.'s 703SC Lima 50-ton crane pulls sheeting on a New Jersey Turnpike widening job. Union says this type setup cuts hose damage and loss of air, increases rig's efficiency.

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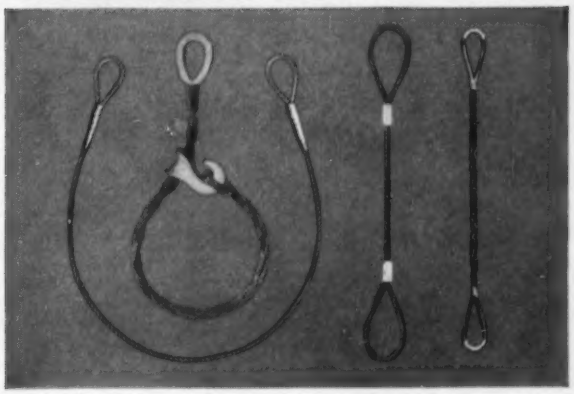

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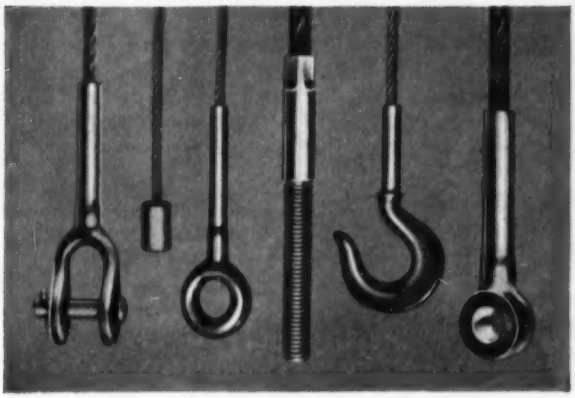

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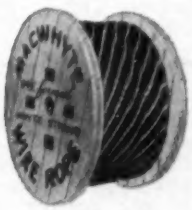

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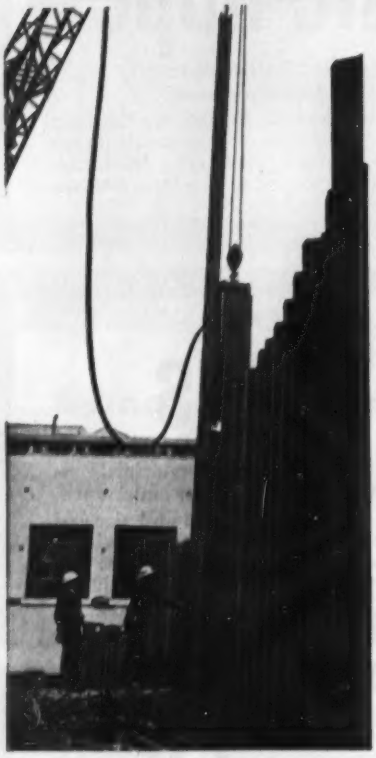
At 3 P.M....

CAVE-IN!



Cave-ins will happen, through no fault of the contractor. On this excavation job, there was erratic soil behavior, shifting loads, saturating rain . . . everything unpredictable.

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September, 1956

Pay Dirt in This Issue

Deep Wells Dewater Huge Excavation 54
A combination of deep wells and wellpoints removes more than 50,000 gpm near the banks of the Mississippi.

Look for More Slipform Pavers 58
Formless paving may be the coming thing. Modified machines are producing top grade pavement on big jobs.

Dome Poured on Earth Mound 60
A contractor takes advantage of a hilly job site and shapes an earth mound to serve as a form for a concrete dome.

Station Rebuilt as Trains Roll 64
Pre-assembled bridge spans and a travelling jack method of erecting them speed reconstruction of a Chicago station.

Car Dumper Feeds Pumping Outfit 82
A railroad-car dumper unloads 180 cars of sand a day into ingenious hydraulic pumping outfit at Newark.

Maintenance Is Tough on Seaway 92
Marine clay and glacial till combine to raise havoc with machines, but rigid maintenance keeps rigs working.

Tractor Hauls Two Scrapers 128
Tandem unit of two scrapers pulled by one tractor hauls total payload of 40 cu yd on a California freeway job.

Pile Driver Fits in Tight Spots 155
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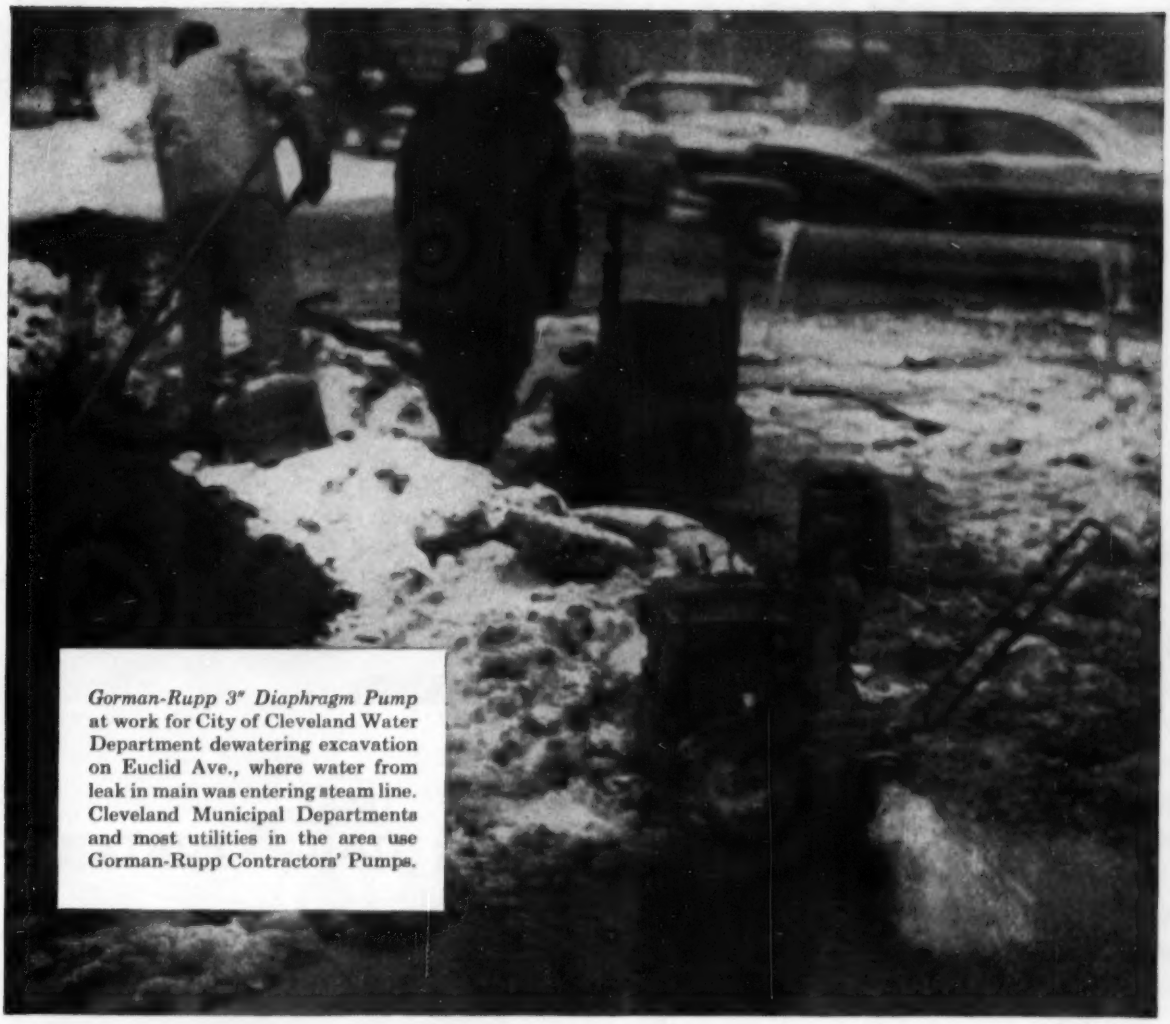
Next Month

The world's longest bridge now is completed, four months ahead of schedule. Stretching nearly 24 mi across Lake Pontchartrain at New Orleans, the $46 million highway bridge is a masterpiece of mass production. An article in the October issue will describe its construction.



Gorman-Rupp 3" Diaphragm Pump at work for City of Cleveland Water Department dewatering excavation on Euclid Ave., where water from leak in main was entering steam line. Cleveland Municipal Departments and most utilities in the area use Gorman-Rupp Contractors' Pumps.

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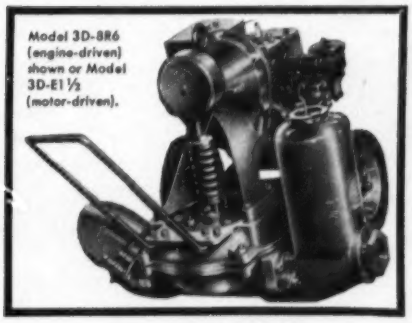

Model 3D-8R6 (engine-driven) shown or Model 3D-E1½ (motor-driven).

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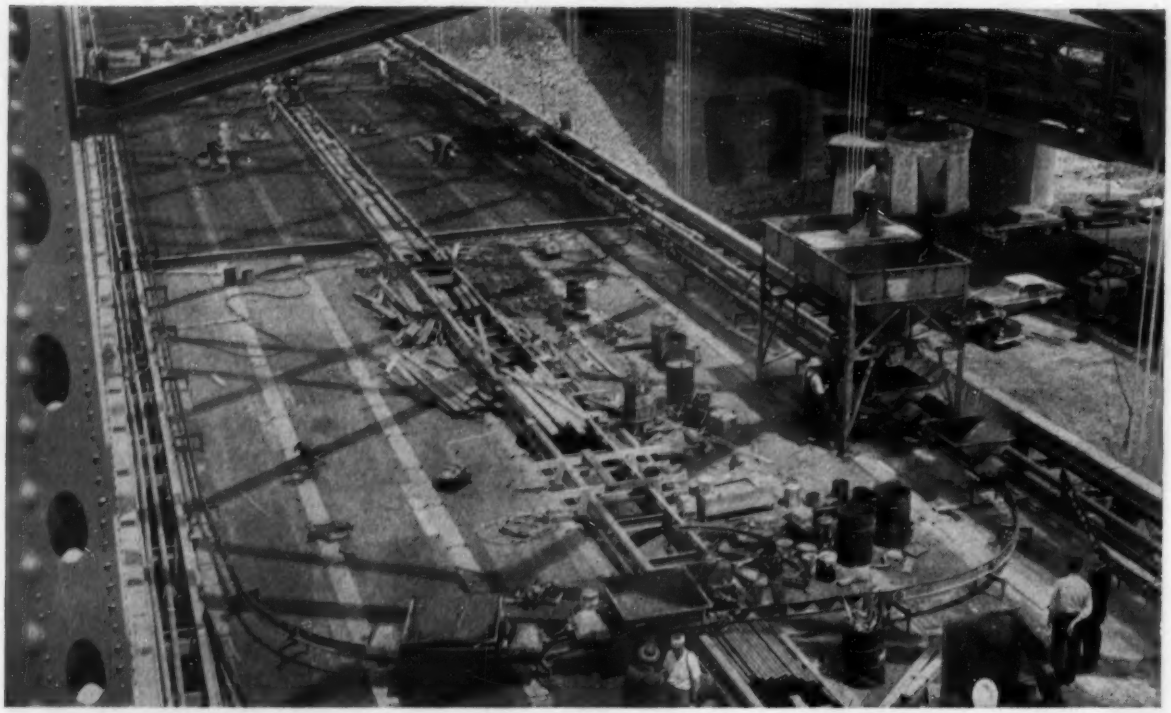

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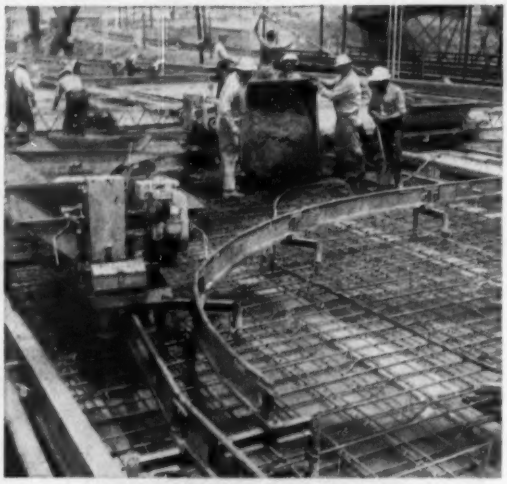

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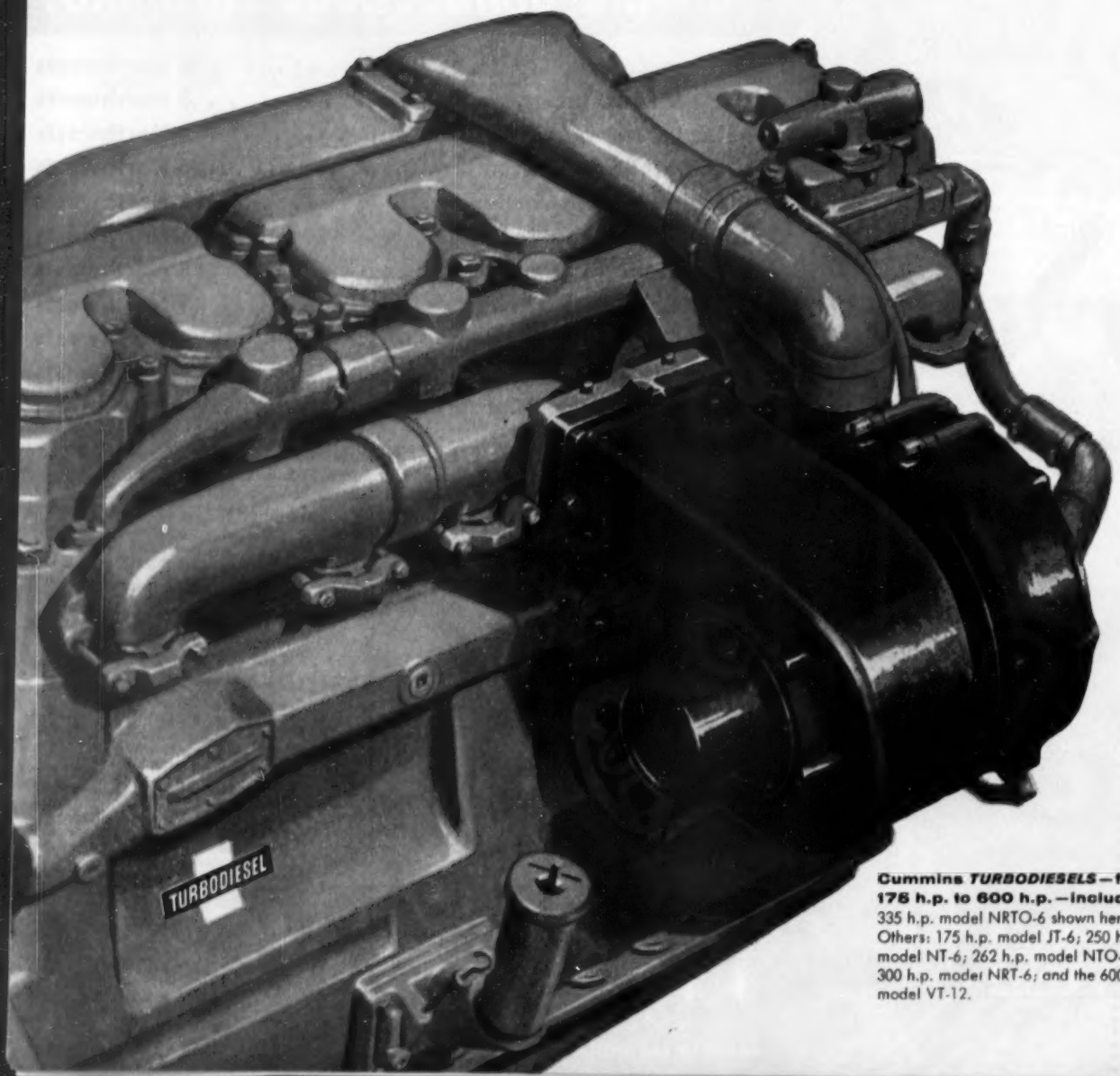

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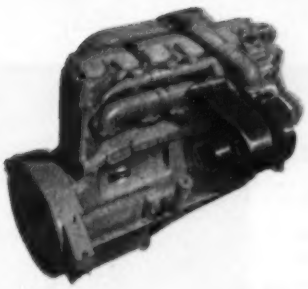

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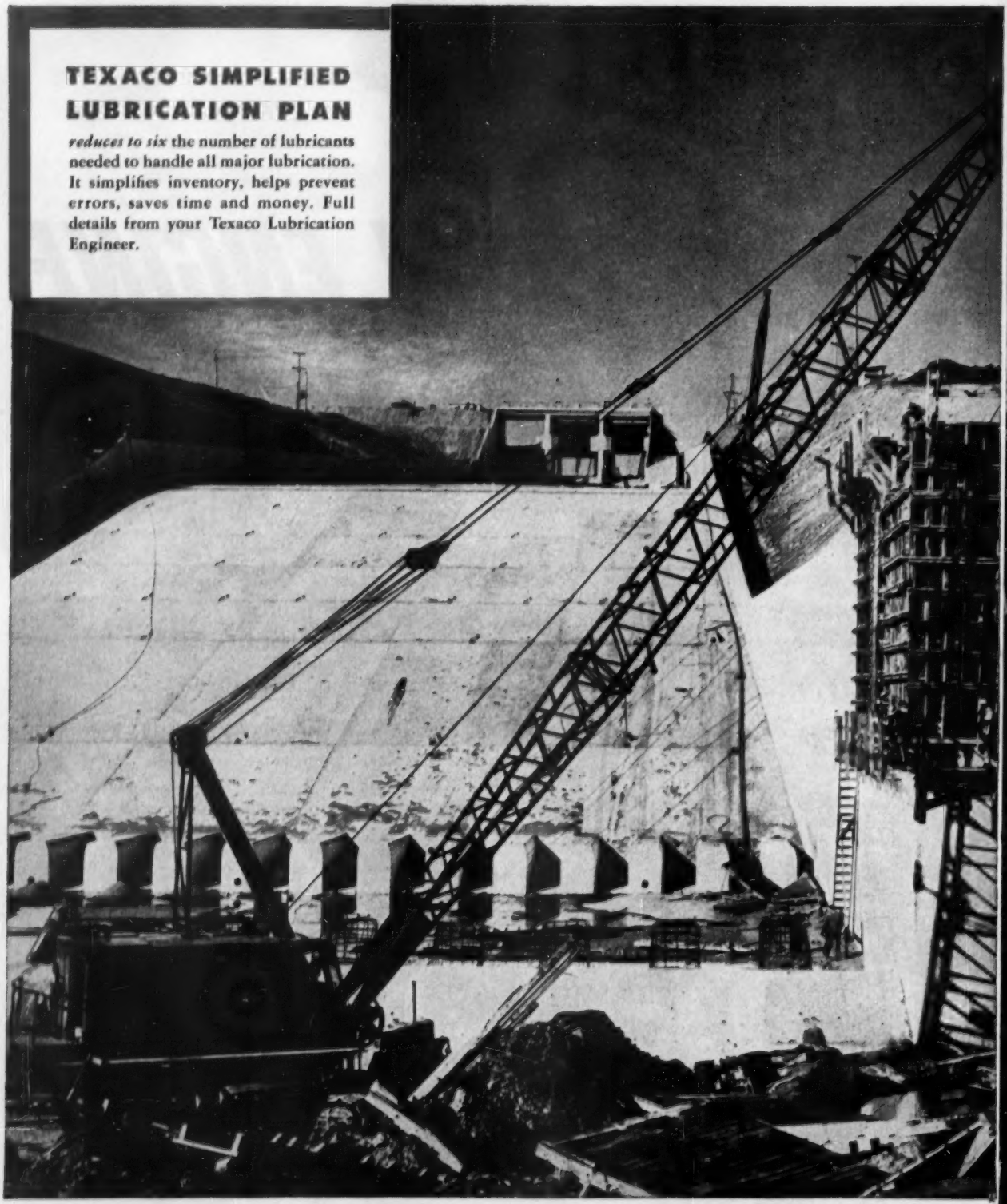
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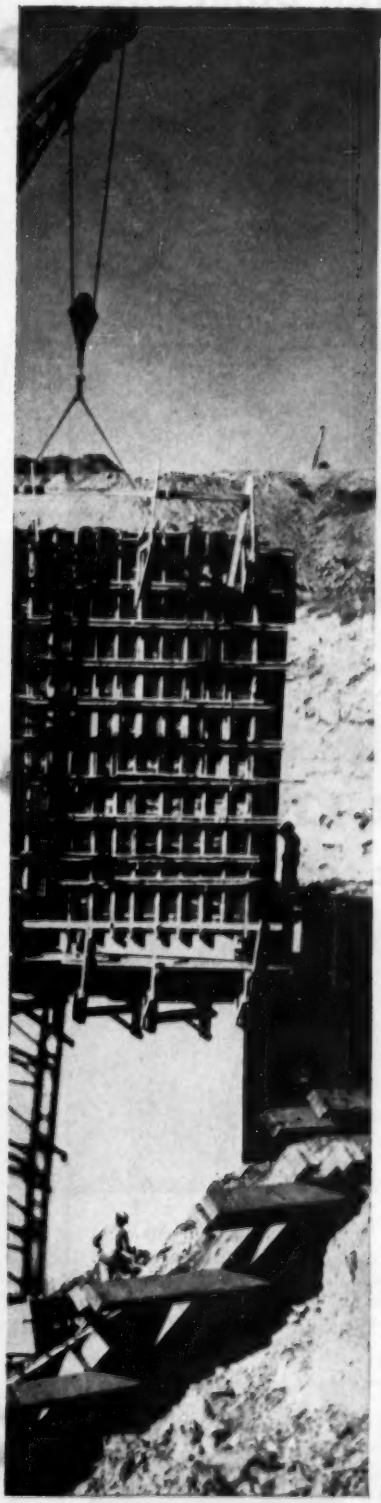

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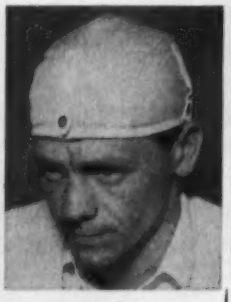

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Rugged, wind resistant and water repellent outside fabric with fleece or wool interior. Specify fleece or wool lining.

CAT. NO. 70-WL-2K

CAT. NO. 70-WL-1K

Wool knitted caps in two styles: as snug, close fitting skull cap, or as elastic knit skaters' type that covers neck and ears.

Fabric and knit combination assures extra warmth and wind protection for ears, neck, head, and forehead.

CAT. NO. 70-WL-3K

Arctic type liner, all wool knit. Protects head and face. Front slips down over mouth.

UNIVERSAL SIZE

Fits all safety hats and caps

Fabric liner snaps over leather or leatherette sweatband, holding hat or cap firmly in place, maintaining full margin of safety protection.

Write for name and location of distributors in your area

EVERYTHING BULLARD IN SAFETY

T.M. REG. U.S. PAT. OFF.

E. D. BULLARD COMPANY

275 EIGHTH STREET • SAN FRANCISCO, CALIFORNIA

SINCE 1898

Construction News from Washington

Washington, D.C.
September, 1956

Easier Borrowing for Small Water Projects

A new law gives Interior Department $100 million to lend to state and local water agencies—without prior approval from Congress. The law, however, does permit Congressional committees to veto within 60 days any loan approved by Interior.

The program will permit Reclamation Districts and the like in 17 western states to borrow up to $5 million for such things as irrigation distribution systems, dams, diversion works, and canals. The theory behind the new law is that local groups can build the works with borrowed federal money at lower cost because standards need not be as high as for federally built projects.

Actually, projects up to $10 million can be built, but the local agency must supply all over $5 million.

Heavy Structural Expansion

Government aid to expand steel mill capacity for structurals and heavy plate is under consideration and may be approved any day. Demand for the heavy construction materials has been more than the industry could supply for some time, largely as a result of new industrial capital expansion, school construction, and public works. The steel strike, plus the new highway program, will put still more pressure on mills. The government aid probably will be in the form of five-year tax writeoffs for steel companies that add structural and heavy plate capacity.

The Commerce Department recommends that the tax aid go only for particular kinds of products—heavy members and structural shapes, especially wide-flange sections.

New Highway Czar

A shake-up in the Bureau of Public Roads still is a strong possibility despite the creation of the new post "Federal Highway Administrator" for the man to head the upcoming multi-billion program.

The new federal highway administrator will be appointed by the President—which automatically assures him of higher status and prestige and power—but he still is subject to the authority of the Secretary of Commerce as was the Commissioner of the Bureau of Public Roads, who was appointed by the Secretary, not the President.

Congressional pressure for a shake-up of the Bureau is based on the fear that as presently organized and manned the Bureau just isn't equipped to handle the new $32.5-billion program. Raising the

rank of the top man isn't likely to satisfy many Congressmen and Senators; they are expected to push next year for an independent commission.

$1.6-Billion Veto

Pres. Eisenhower's veto of the regular rivers and harbors authorization bill—which would have authorized $1.6 billion of construction—will have no impact on construction volume. There is a backlog of $6.5 billion of authorized projects already on hand.

Pres. Eisenhower found that one-third of the projects in the new package hadn't been reviewed by all the agencies that are cut in on the program. In fact, Army Engineers informally advised several Congressmen that some of the projects authorized in the bill had absolutely no engineering or economic justification and were "a complete waste of the taxpayer's money."

Congress will take up the bill again next year. At the same time, it will act on an appropriation bill to provide money to build the projects. Even if the President had approved the authorization bill, no money would have been available to start the projects this year because Congress made no appropriation for the work.

More Flood Control Money

Department of Agriculture won a victory on flood control in this session of Congress. There's new freedom given the Department's Soil Conservation Service to plan, grant money, and build small flood control and water supply structures—and a boost in funds to go with the new authority.

Soil Conservation's kitty for building installations will be up 50% for the year just ahead—an estimated $12.5 million compared with $8 million last year. Balance of this year's total of $17.5 million goes for working up plans for projects. Agriculture now can help plan municipal and industrial water supply projects, too, even if no agricultural benefit is involved. But the project has to be part of a planned watershed program, of course.

Lease-Purchase Business Up Again

Lease-purchase construction program of General Services Administration now totals $470 million in projects ready to go. Additional projects virtually approved bring the total to $700 million.

Regulations have been revised by GSA to help get more bids, particularly for the financing of projects. GSA feels that the first experience shows not enough interest from investors to get the construction going as quickly as it would like. Construction contractors at the outset have shown more interest.

One tool does what four did before!

NEW THOR UTILITY AIR HAMMER

Swivel hose connection
Free swiveling air connection keeps hose from kinking.
Easy lubrication
Oversize oil reservoir can be filled without using a wrench.
Thor exclusive stop rotation
Instant conversion with the flick of this handy cam lever.
Weight only
14
LBS.

Thor exclusive stop rotation gives you a light demolition tool, a drill, a light clay digger, a chipping hammer—all in one compact tool.

Thor Model 15 Utility Hammer converts instantly from a self-rotating rock drill to a non-rotating hammer with a flick of an external cam lever.

NOW THOR offers a better all-purpose tool—a tool which drills, chips or breaks concrete and masonry. Only the compact Thor Model 15 Utility Hammer has instant stop rotation.

The Thor Model 15 Utility Hammer is easy to handle, easy to use and mighty easy on air. Try this amazing new tool. Any Thor distributor will be glad to give you a demonstration. Thor Power Tool Company, Aurora, Illinois.

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PORTABLE POWER
TOOLS

THOR POWER TOOL COMPANY

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IT'S HERE!

THE BIG ADVANCE IN 2-WAY RADIO

Bendix DYNA-COM

. . . and here are 10 ways it helps CONTRACTORS and BUILDERS save money

Coordinates men and equipment ★ Speeds repairs Expedites orders faster ★ Cuts no-load miles ★ Improves operator's morale ★ Controls field operations Cuts down-time ★ Enables equipment to be shifted quickly from one site to another ★ Helps meet emergencies in minimum time ★ Eliminates vehicle messenger miles

Good communication is vital in keeping projects running smoothly and in meeting construction deadlines. And that's just what Bendix*Dyna-Com Radio gives you. Good, clear, dependable communications. Radio contact frees superintendents and field foremen from extra miles of driving making routine checks. It allows them to spend more time at critical points where they are needed most. Bendix Dyna-Com Radio provides the instant voice contact between all key personnel that results in smoother, on-schedule operation. It prevents duplication of work effort, eliminates lost time for both men and equipment.

FROM SUPPLY BASE TO CONSTRUCTION SITE Bendix 2-Way Radio performs many time-saving functions from supply base to construction site. In addition to solving traffic control problems, it enables you to put equipment where it is needed most in minimum time. Loading tie-ups are avoided, material flow speeded. Complete coordination of men, supplies and equipment through use of Bendix 2-Way Radio boosts over-all efficiency.

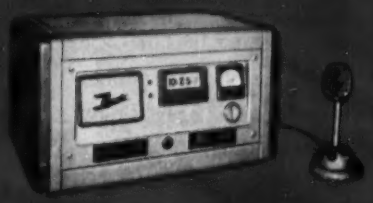
NEW!

Dyna-Com Mobiles Cover all frequency ranges: 25-54 mc; 144-174 mc; 450-470 mc. Available in power outputs from 15 to 60 watts. Interchangeable between 6 and 12 volt vehicles without modification.

NEW!

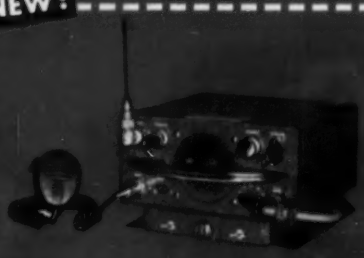
Dyna-Com Portables Greater versatility and flexibility than any other portable equipment. Compact, lightweight, full 1-watt output. Extra-long battery life. Complete line of accessories including a transistorized, plug-in loud-speaker.

NEW!



Dyna-Com Consoles and Base Stations For 25-54 mc; 144-174 mc; 450-470 mc; delivering from 20 to 60 watts output. Operate from 117 volt AC power lines. Quality engineered for performance and appearance.

NEW!



Bendix Bantam For low-power, limited range application as a mobile unit or base station. Provides more than 1-watt power output. Operates from 6, 12, 24, 32 volts DC or 117 volts AC without modification or costly converters. Adds flexibility to any communications system.

COMPLETE NEW LINE OF PRECISION-BUILT FM MOBILE UNITS AND BASE STATIONS FOR ALL FREQUENCIES!

The result of over 5 years laboratory research and development, Bendix Dyna-Com is the first big advance in 2-way radio in over a decade. All new from chassis to cabinet, each model incorporates all the latest improvements which have made Bendix the foremost leader in railroad and aviation communications; in airborne navigation; in radar and in military electronics.

For example, Dyna-Com's unitized design sets a new standard for performance and dependability. It features plug-in, interchangeable chassis construction which speeds service and saves maintenance costs. Any chassis in the Dyna-Com line can be transferred, without adjustment or modification, between mobile units and base stations.

Bendix Radio

DIVISION OF BENDIX AVIATION CORPORATION BALTIMORE 4, MD.

Find out how Bendix Dyna-Com can boost the efficiency of your organization. Let a Bendix Communications Engineer survey your communication needs without obligation. Call or mail the coupon today for full information on Dyna-Com—*the first big advance in 2-way radio!* *Reg. U. S. Pat. Off

Bendix Radio
Mobile Sales, Dept. F
Baltimore 4, Md.

Gentlemen:

Please send me complete details about Bendix Dyna-Com 2-Way Radio.

☐ 25-54 mc. ☐ 450-470 mc.
☐ 144-174 mc. ☐ Bantam ☐ Portable

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Title_____

Firm_____

Street_____

City_____ State_____

LOOK TO THE ALLIS-CHALMERS LINE . . . TO

Match the needs of your tractor

If you're looking for big capacity, mobility and wide-range versatility — at low cost — the tractor shovel you need is in the Allis-Chalmers line.

First — advanced-design features make Allis-Chalmers tractor shovels the most productive and widely accepted in earth-moving and material handling fields. Second — each unit offers a shovel that's a built-in part of the tractor — not just an attachment. Third — you have a choice of four sizes to match the needs of your jobs most efficiently.

You can increase Allis-Chalmers tractor shovel usefulness even more by replacing the standard bucket with a variety of quick-change attachments, such as a light materials bucket, rock bucket or rock fork . . . or by adding a rear-mounted ripper.

On every job, your Allis-Chalmers tractor shovel provides all these important advantages for you and your operator:

- Superior balance and low center of gravity
- Sure-footed stability with extra long track
- Greater strength with heavy, welded-steel shovel, side frames and low stabilizer
- Bucket design that makes loading and dumping fast, clean and easy
- Simplified hydraulics with 3-way, full-flow filtering
- Powerful, long-life Allis-Chalmers diesel engine
- All-steel main frame and one-piece final drive and steering clutch housing
- Timesaving service simplicity
- Heavy-duty roller bearing truck wheels
- 1,000-hour lube intervals on truck wheels, idlers and support rollers
- Better visibility, comfortable seats, and easy operating, accessible controls

4 YD

HD-21G

torque converter drive
13-ft, 4-in. dump height
204 net engine hp
66,500 lb

3 YD

HD-16G

torque converter drive
12-ft, 3-in. dump height
150 net engine hp
47,800 lb

shovel jobs

1½YD

HD-6G
10-ft dump height
57 net engine hp
19,600 lb

2¼YD

HD-11G
11-ft, 7-in. dump height
105 net engine hp
32,000 lb

Ask your Allis-Chalmers Construction Machinery dealer for the complete story and for a look at one of these great tractor shovels at work. And remember, your dealer is headquarters for factory-trained servicemen, factory-approved facilities and complete stocks of True Original Parts.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

In Pasco, Washington, too— Clevelands® do the digging

DISTRIBUTION SYSTEMS in Pasco and Kenewick, Washington, are being constructed for Cascade Natural Gas Company by A. J. Curtis Construction Company of Casper, Wyoming. Even in alleys and similar narrow rights of way, such as the 4-inch main installation shown, Curtis, cashing in on the compactness and maneuverability of his Cleveland trenchers, is averaging 1,650 feet of trench per 6-hour day.

Crowded cramped quarters or open fields, rocky soils or easy digging—Cleveland's original compactness, maneuverability, exclusive wide range of power and speed combinations and recognized quality construction are the reasons they dig *more trench . . . in more places . . . at less cost.* That's why you'll find Clevelands leading the way on gas work in the Pacific Northwest—as they have *everywhere* for over 30 years.

THE CLEVELAND TRENCHER CO.

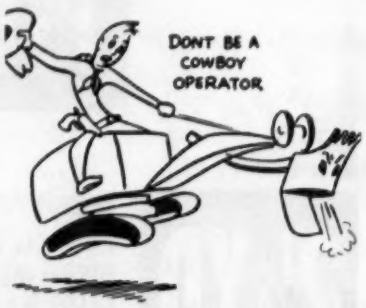
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

Good Everywhere

Job Talk . . .

Better Shovel Operation

Here are a few more suggestions from the Power Crane and Shovel Association's booklet, "125 ways to Better Power Shovel-Crane Operation:"

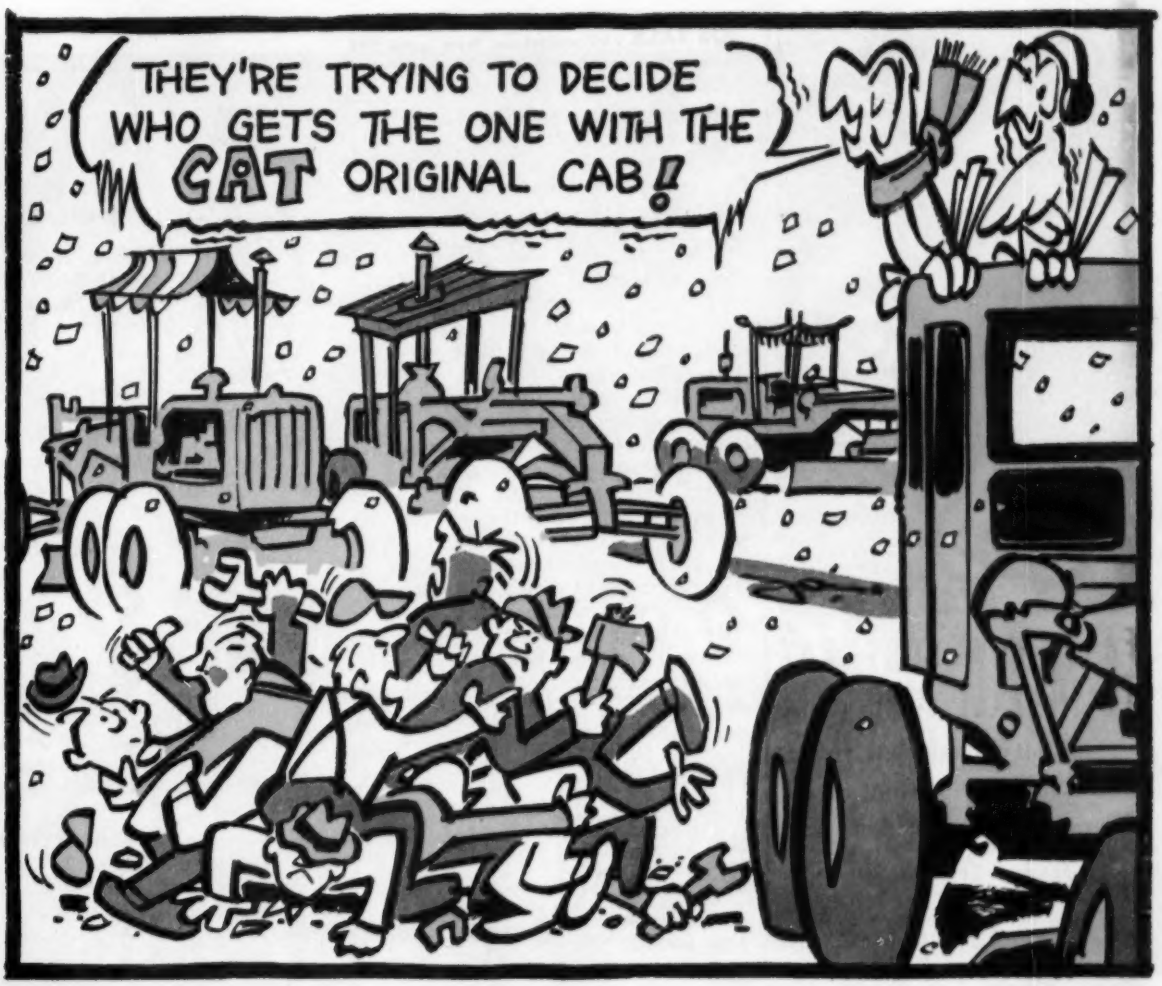


Steady Production Counts—Develop a smooth well-balanced working cycle, with maximum safe overlap of motions. Jerky, cowboy operation may be flashy, but it's hard on the machine and, in the long run, doesn't produce the biggest yardage.

Watch monthly output rather than daily records. Set a comfortable pace you can maintain; then keep it up on every shift. The amount of dirt you move is what counts with the boss—not how good a show you put on!

Keep Busy—While waiting, make any necessary adjustments. Move up, loosen the bank, clean up the corners, and level the grade. The minutes you lose waiting represent yards that don't get into the wagon.

Don't be a "Lever-Fighter"—Be at ease and don't fight the levers. If anything goes wrong, don't start



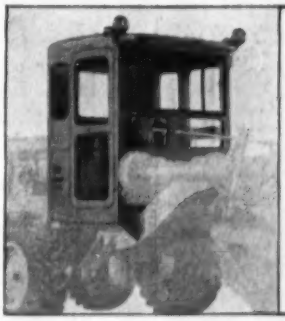
Thinking of an attachment for your Caterpillar machine?

Be sure of these points: Is it ruggedly built—as ruggedly built as the big yellow machine it'll work with? Does it attach and detach easily? Is it designed with your operator's safety in mind? Is it *complete*, or will it need special fittings?

CAT* attachments fill the bill every time. They increase operator comfort and convenience—which means increased efficiency. You get *more work* out of your machine.

See your Caterpillar Dealer's Parts Representative for information and catalogs on the complete line of Cat original attachments for your machines.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



Cat all-weather steel cabs are tailored to fit exactly your Caterpillar-built Tractor and Motor Grader. Simple to install, yet they afford maximum vision while keeping out wind, snow, sleet, rain and dust.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

FAST, LOW-COST WAY TO INSTALL PIPE . . .

push it under streets, roads, tracks, lawns with a timesaving

GREENLEE HYDRAULIC PUSHER

Speed underground piping jobs this way. GREENLEE Pusher is one-man-operated (by hand or with power pump), portable, simple to set up and use. No tearing up of pavement, floors, lawns . . . does away with extensive ditching, tunneling, backfilling, repaving. GREENLEE Pusher cuts job time to a fraction . . . often pays for itself on first job.

Two feet per minute average pushing time

GREENLEE Pushers are available in two sizes: No. 780 for ¾" to 4" pipe . . . No. 795 for pipe over 4", concrete sewer pipe, large ducts. Average performance of No. 780, shown above with power pump, two feet per minute. Write for literature.

GREENLEE

GREENLEE TOOL CO.

2189 Columbia Avenue • Rockford, Illinois

JOB TALK . . . continued from page 120

to fight the machine and force it beyond its ability or your control of it. To do so is a good way to tear up transmission, gears, clutches, brakes. Remember, bad temper means bad performance.

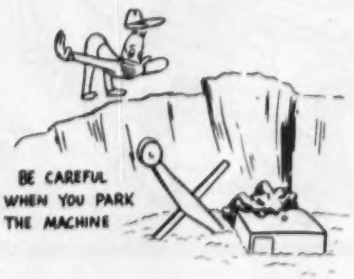
Have a Plan—

(a) Keep the machine in good operating condition, especially clutches, brakes and controls.

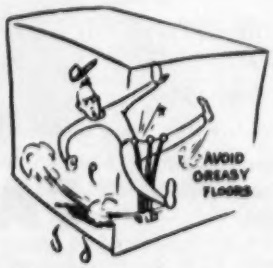
(b) Adjust band clutches when they are at operating temperatures. Be sure clutches have proper clearances with friction drums when released. Otherwise dragging may occur which will cause excessive wear and hard operation.

(c) Use the proper lubricants, and in the amounts and on the schedule recommended. Correct lubrication means longer machine life.

(d) Shut off the power, disengage engine clutch, and lock all controls before leaving the cab.



(e) Don't park your machine overnight, or for the week-end, when there is a chance of a bank caving in on it. Don't leave it in a low-spot where heavy rains or floods are apt to wash out the footing.

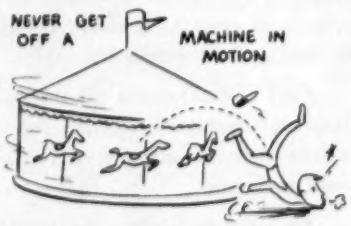


(f) Be a good housekeeper. Keeping a machine in good repairs is not enough. You also should be careful to remove dirt and grit and to keep your machine free of excess oil, grease, mud, and rubbish. Good housekeeping will reduce accident and fire hazards.

(g) Replace all guards and panels that are meant to protect you from moving machinery.

Warm Up Before You Start to Pitch—Warm up a cold engine by letting it idle slowly. Don't use the choke more than is absolutely necessary.

Shift Jaw Clutches at Slow Speed—When shifting jaw clutches, be sure the jaw clutch shafts are stationary or running at very slow speeds before engaging or disengaging jaw clutches.



NEVER GET ON OR OFF a Machine in Motion—If you do, centrifugal force may throw you for a nasty, injurious spill.

Stop the Machine for Lubrication or Adjustment—Stop all operations when cleaning, adjusting or lubricating the machine. Usually this can be done by disengaging the power-take-off clutch but if it's going to be a long delay, shut off the engine completely.

Now your men can work in warm, well-lighted comfort, protected from cold or stormy weather. Use easy-to-handle, transparent VISQUEEN film to close openings. Tough, yet lightweight (1000 sq. ft. of 4 mil VISQUEEN weighs less than 20 pounds), VISQUEEN film can be used again and again.

No other material does so much at such low cost to you. Use VISQUEEN film under slabs, in foundations and as flashing around windows and doors. Perfect to cover finished millwork, brick and other materials subject to water damage. Only VISQUEEN film is available in widths to 32 feet.

marked every foot for your convenience!

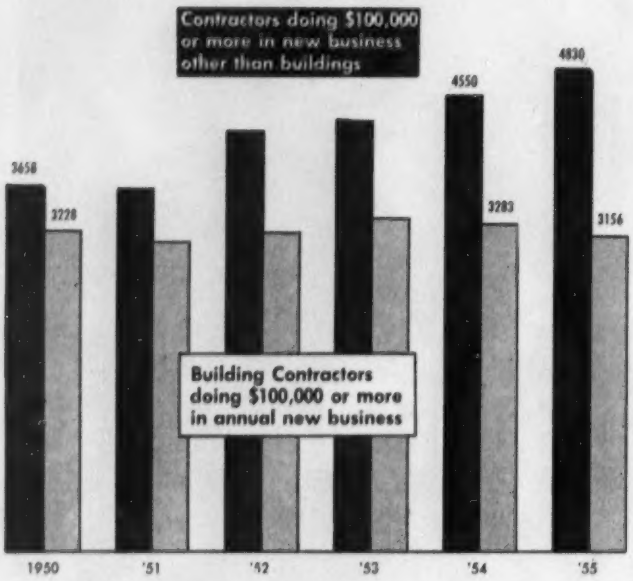
Important! *VISQUEEN Film is all polyethylene, but not all polyethylene is VISQUEEN. Only VISQUEEN has the benefit of research and resources of*

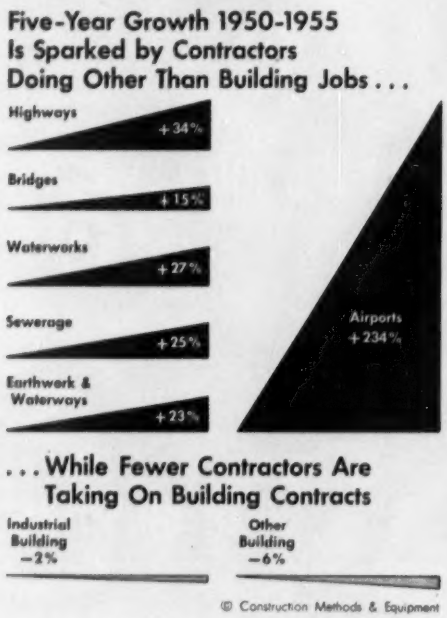
THE VISKING CORPORATION
World's largest producers of Polyethylene sheeting and tubing
IN CANADA: VISKING LIMITED, LINDSAY, ONTARIO • IN ENGLAND: BRITISH VISQUEEN LIMITED, STEVENAGE

information request tag
VisQueen®
clip this tag—PCM10-1410
attach to letterhead, mail.

It's Your Business . . .

Heavy Construction Contractors Grow Bigger and Bigger




Five-Year Growth 1950-1955 Is Sparked by Contractors Doing Other Than Building Jobs . . .
Highways +34%
Bridges +15%
Waterworks +27%
Sewerage +25%
Earthwork & Waterways +23%
Airports +234%
. . . While Fewer Contractors Are Taking On Building Contracts
Industrial Building −2%
Other Building −6%
© Construction Methods & Equipment

Contractors Are Growing Faster

Heavy construction contractors are growing bigger than ever, and there are more of them actively in the construction industry than ever before. In fact, a record number of nearly 8,000 contractors wrote at least $100,000 in new contract business during 1955. This number is 2% more than the previous record in 1954, and the total dollar volume of their contract awards is up to 20% to a booming $11.9 billion.

(Continued on page 29)

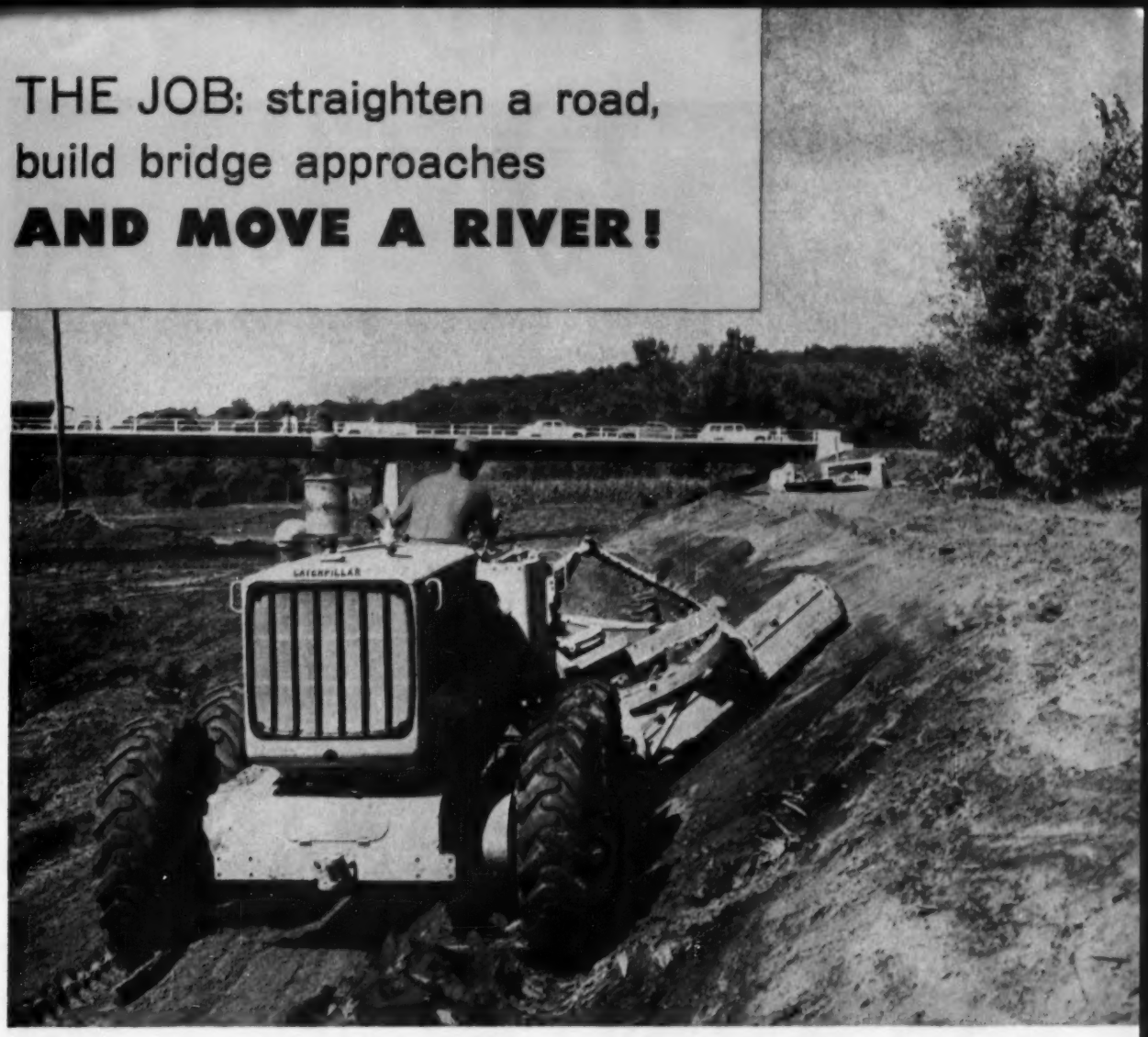
How 7,986 contractors with $100,000 or more in contracts divided 17,511 projects costing $11.9 billion in 1955

Type of work	Number of Contractors 1955	% Chg. fr '54	Number of Projects 1955	% Chg. fr '54	Contract Value (millions) 1955	% Chg. fr '54
TOTAL	7,986	+ 2	17,511	+ 0.1	$11,890	+ 20
Total-other than building	4,830	+ 6	11,720	+ 2	$ 5,288	+ 24
Waterworks	679	− 0.6	1,061	− 2	299	+ 33
Sewerage	886	+ 4	1,344	− 3	386	+ 3
Bridges	683	+ 0.3	1,029	− 0.1	510	+ 14
Streets and roads	2,316	+ 3	5,372	− 3	1,984	+ 14
Earthwork & waterways	549	+ 5	759	+ 6	710	+134
Airports	809	+ 34	1,214	+ 45	667	+ 26
Unclassified	775	− 2	941	+ 1	732	+ 17
Federal (incl. above)	1,262	+ 14	1,912	+ 24	1,077	+ 31
Total-Building	3,156	− 4	5,791	− 3	6,602	+ 17
Industrial	1,131	− 0.4	1,693	− 1	2,424	+ 28
Mass housing, commercial, public	2,458	− 7	4,098	− 4	4,178	+ 12
Federal (incl. above)	189	− 5	316	+ 24	376	+143

Contractor New Business by Size of Firm—1955

Type of Work	Firms with $1,000,000 or more in construction contracts: Number of Contractors 1955	% Chg. fr '54	Number of Projects 1955	% Chg. fr '54	Contract Value (millions) 1955	% Chg. fr '54	Firms with $500,000-$1,000,000 in construction contracts: Number of Contractors 1955	% Chg. fr '54	Number of Projects 1955	% Chg fr '54	Contract Value (millions) 1955	% Chg. fr '54	Firms with $100,000-$500,000 in construction contracts: Number of Contractors 1955	% Chg. fr '54	Number of Projects 1955	% Chg. fr '54	Contract Value (millions) 1955	% Chg. fr '54
TOTAL	2,518	+ 11	8,890	+ 9	$9,834	+ 26	1,555	+ 2	3,303	− 4	$1,038	− 0.1	3,913	− 3	5,318	− 10	$1,019	− 4
Total-Other-than-Building	1,234	+ 16	5,312	+ 12	$3,996	+ 31	891	+ 6	2,377	− 1	$ 639	+ 12	2,703	+ 2	4,031	− 7	$ 653	+ 3
Waterworks	216	+ 2	406	− 3	200	+ 45	107	− 7	195	+ 1	38	+ 12	356	− 0.3	460	− 3	61	+ 15
Sewerage	283	− 4	452	− 7	217	− 3	158	+ 18	292	+ 12	69	+ 15	495	+ 4	600	− 6	101	+ 10
Bridges	302	+ 6	505	+ 13	382	+ 11	123	− 12	201	− 11	74	+ 40	258	+ 0.4	323	− 10	54	+ 6
Streets and roads	708	+ 21	2,567	+ 7	1,426	+ 19	483	+ 5	1,170	− 7	296	+ 7	1,125	− 6	1,635	− 13	263	− 4
Earthwork & waterways	345	+ 20	371	+ 32	644	+175	77	− 7	125	+ 2	28	− 7	227	− 3	263	− 15	38	− 3
Airports	349	+ 40	643	+ 61	530	+ 24	139	+ 18	212	+ 21	69	+ 23	321	+ 35	359	+ 37	67	+ 49
Unclassified	277	+ 8	368	+ 13	597	+ 23	130	− 4	182	+ 4	65	+ 8	368	− 7	391	− 10	69	− 13
Federal (incl. above)	506	+ 20	955	+ 38	846	+ 33	212	− 0.5	341	+ 5	120	+ 20	544	+ 16	616	+ 17	112	+ 27
Total-Building	1,284	+ 7	3,578	+ 5	$5,838	+ 24	662	− 3	926	− 11	$ 399	− 15	1,210	− 14	1,287	− 17	$ 366	− 15
Industrial	495	+ 3	925	+ 2	2,309	+ 34	153	− 6	216	− 8	17	− 74	483	− 2	552	− 3	99	− 1
Mass housing, commercial, public	1,123	+ 6	2,653	+ 7	3,529	+ 18	583	− 7	710	− 13	382	− 5	752	− 21	735	− 25	267	− 19
Federal (incl. above)	104	− 10	120	+ 20	343	+158	27	− 10	36	+ 44	17	+ 70	58	+ 12	60	+ 22	17	+ 42

THE JOB: straighten a road, build bridge approaches **AND MOVE A RIVER!**



This CAT* No. 12 Motor Grader is helping cut out a new channel for the Iowa River near Marshalltown.

It's part of a project which called for straightening curves in a county road, building approaches to a bridge, and diverting a meandering river beneath its new span. The length of road involved was only 0.8 of a mile, but Mickle and Ross Construction Co., of Newton, Iowa, moved nearly 100,000 cu. yd. of dirt.

Foreman Virgil E. Reynolds had a fleet of 11 Caterpillar machines on the job. "We don't have an off-breed in the outfit," he said.

Working close to water like this is tough going. The No. 12 had to maneuver in mushy, sandy loam. "Occasionally machines hit silt pockets and nearly dropped out of sight," Supt. Reynolds said, "but I never worry when I've got the right equipment... and I've got the right equipment."

The No. 12 is "the right equipment" for contractors all over the country—for four big reasons. Costs less to maintain. Costs less to operate. Produces more. Lasts longer.

Your dealer would like a chance to back up each one of these claims with specific details. The exclusive Caterpillar oil clutch, for instance, that gives up to 1500 hours' service without adjustment. And the new tubeless tires (now standard equipment) that can eliminate 80% of the down time caused by tires.

Let your Caterpillar Dealer demonstrate the dozens of other features that make the No. 12 the high-producing, cost-cutting motor grader it is.

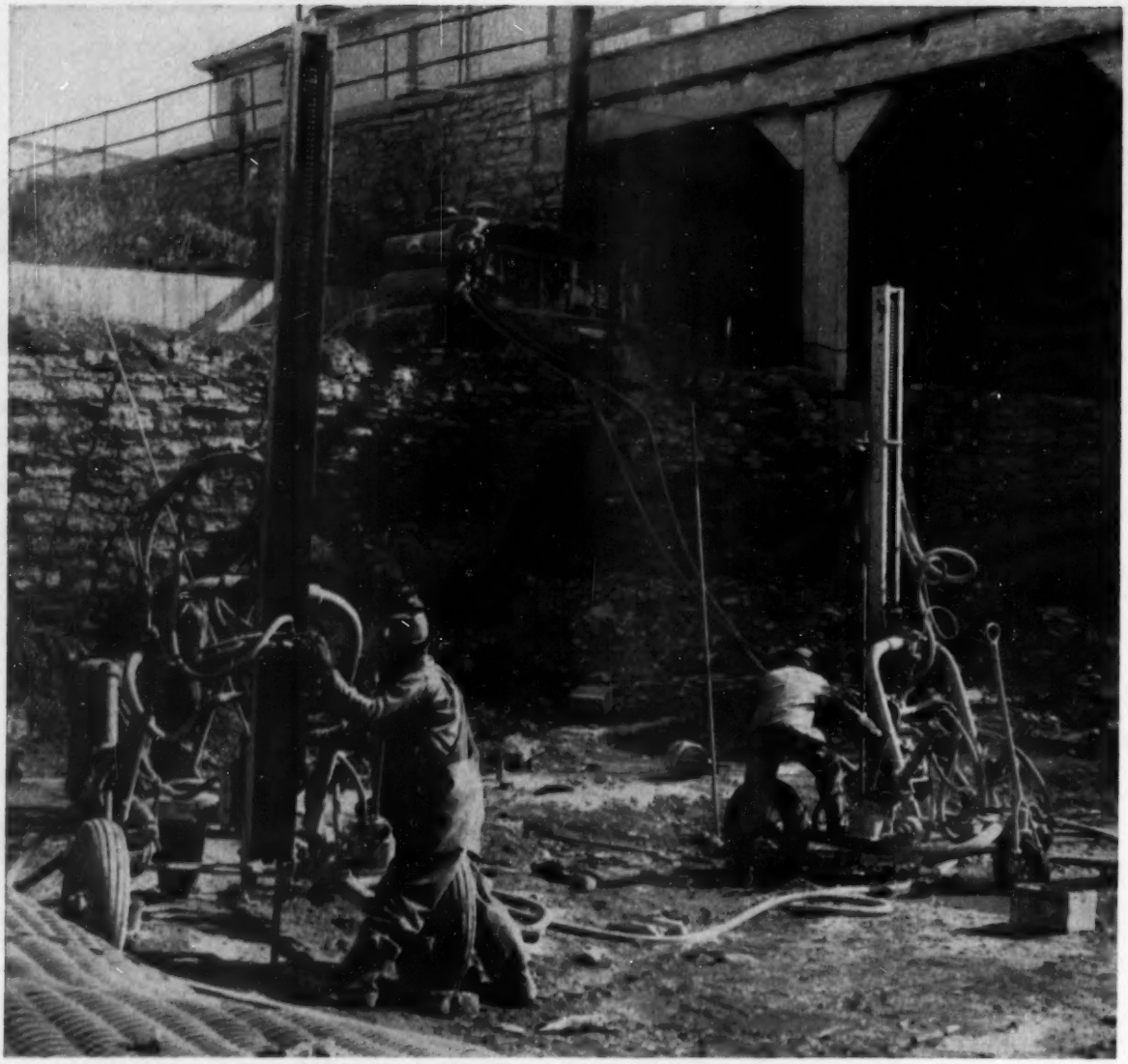
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

99% OF ALL CAT MOTOR GRADERS EVER BUILT ARE STILL ON THE JOB

(Advertisement)



500′ PER 9 HR. DAY IN TENNESSEE LIMESTONE: For the rock portion of the 351,000 cu. yd. excavation for Capitol Hill Redevelopment project at Memphis, Tenn., J. B. Michael Construction Co. powered their two wagon drills with a Jaeger rotary "600" compressor. "We start it and never worry about plenty of air for the two wagon drills, averaging 500′ per 8-hour day, without lugging or overheating", says job superintendent David B. Phillips.

Jaeger 600 Rotary . . . *your most efficient power for wagon drills*

A Jaeger "600" rotary compressor produces the same 600 cfm of air as other "600" compressors, *using the same 6-71 GM diesel engine at 100 to 150 rpm slower speed (1650 rpm instead of 1750 or 1800).*

On long hours of steady drilling this slow, cool, efficient operation means substantial fuel savings, fewer fpm of engine piston travel, up to 9000 fewer compressor revolutions every hour you work.

Smaller Jaeger Roto Air Plus® units have this same characteristic of low speed, high efficiency performance. It will pay you to get full details or demonstration from your Jaeger distributor—or let us send you Catalog JCR-5.

50th year JAEGER CONSTRUCTION EQUIPMENT

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS

Triumph over Channel Chatter

THE NEW DIMENSION IN 2-WAY RADIO COMMUNICATION

Truly a new concept in two-way radio communications—the result of years of extensive engineering and "on-the-job" field testing. Now you can "get off the party line". No longer is it necessary to listen to a constant stream of "channel chatter". PRIVATE-LINE radiophone is *completely quiet* except when receiving a call from another PRIVATE-LINE radiophone in the same operation.

- **reduces missed and misunderstood messages**—operators hear only messages within their own operation.
- **increases overall efficiency**—fewer errors mean more productive utilization of time—fewer repeat messages—more dispatched vehicles per hour . . . real advantages during peak load periods.
- **increases area coverage**—"coded squelch" circuit automatically maintains optimum receiver sensitivity, assuring maximum communications range at all times.
- **easier to operate**—no additional buttons, lights, adjustments or operational techniques—elimination of squelch adjustments makes it even simpler to operate than conventional two-way radio.
- **reduces operator fatigue**—elimination of "channel chatter" enables operators to concentrate on their jobs—reduces tension, providing a more pleasant atmosphere—increases job satisfaction.
- **selective**—This amazing new circuit opens the speaker only when receiving a properly coded transmission from a PRIVATE-LINE radiophone in the same operation. NUISANCE NOISE, MESSAGES FROM NEARBY SYSTEMS ON THE SAME CHANNEL, AND SKIP INTERFERENCE FROM DISTANT SYSTEMS *CANNOT* UNLOCK THE SPEAKER.
- **automatic**—does not require manual adjustment—electronically maintains feather edge sensitivity at all times.
- **silent**—coded subcarrier is inaudible—normal carrier-off noise burst or "squelch tail" is eliminated from the output of mobile receivers.
- **built-in**—tone circuitry is incorporated as an integral part of compact transmitter and receiver chassis.
- **precise**—Motorola's exclusive VIBRASENDER and VIBRASPONDER electromechanical resonant tone devices assure precision stability, selectivity, and reliability.

Technical men will be quick to note that PRIVATE-LINE radio does not employ a conventional tone-pulse selective calling system, but, instead, a continuous inaudible tone-coded subcarrier system which opens the speaker only for calls from transmitters in the system. Interfering signals cannot "trip-open" or "lock-in" the speaker, since only the properly tone-coded carrier keeps speaker open.

MOTOROLA
2-Way Radio

MOTOROLA Communications & Electronics, Inc.
4501 Augusta Boulevard Chicago 51, Illinois

Send coupon now for illustrated brochure

CM&E

Name _____ Title _____

Organization _____

Address _____

City _____ Zone _____ State _____

Announcing the BIG, ALL NEW

SHAWNEE® Chief

MODEL "D90" BACKHOE

Featuring Exclusive

PUSH PULL POWER

DIGS 14 FT. DEEP!

Another Shawnee exclusive — PUSH-PULL POWER! The top cylinder **pushes** on the Bucket Boom and the bottom cylinder is synchronized to **pull** . . . provides more digging power.

Digging is efficient to 14 feet — actual reach below surface is 15 feet.

★DIG DEEPER!
★REACH FURTHER!
★MORE POWER!

Ad-552

SALES AND SERVICE COAST TO COAST

For Complete Information, write:

SHAWNEE manufacturing company, inc.

1947 SS N. TOPEKA AVE., TOPEKA, KANSAS

Most spectacular is the rate at which firms doing heavy construction other than building are breaking past the $100,000 per year mark in total new contracts. The number of these firms increased by 6% to an all-time high of 4,830 in 1955, the fourth consecutive year in which the ranks of this group have expanded. The 1955 increase brings the five-year rise since 1950 to a thumping 32%. There now are more than three times as many firms with $100,000 volume per year as there were in 1940.

By contrast, the ranks of building contractors doing $100,000 in annual new business have remained relatively steady in number during the last five years. However, it is significant that their number dipped for the second consecutive year in 1955. Since 1950, they have slipped from 47% of all heavy construction contractors doing $100,000 per year new business to slightly less than 40% last year. Furthermore, there were about 3% fewer of these firms in 1955 than there were five years ago and nearly 6% fewer than in the peak year 1953.

In every major type of heavy construction other than building, the number of contractors has grown rapidly since 1950 (see chart above). The sharpest rise is in airport construction where the U.S. Air Force is the main customer, but municipal airport construction, too, is on the upgrade. Actually, the unusually big percentage increase in airport contractors since 1950 is due to the fact that Air Force expansion, precipitated by the outbreak of the Korean War, was just starting to roll in 1950 for the first time since World War II. Since 1951, the airport construction market has been a major source of new business for contractors, though awards have run up and down the scale from year to year. In 1955, for example, a burst of new contracts caused the number of airport contractors to jump by 34%.

The number of contractors doing airport construction has increased most percentagewise since 1950, but highway contractors can claim the largest increase in the actual number of new firms during this period. In the last five years, contractors active in the highway field have increased by 589 to a record 2,243 last year. That's a 34% gain over the 1950 total and prospects are that this upward trend will continue, perhaps at an even faster pace, for the next two or three years as the new expanded highway program gets rolling.

The rapid growth of the sewerage and waterworks markets also has attracted a much larger number of contractors. In 1955, there were 25 to 27% more firms active in each of these important fields than in 1950. The number of sewerage contractors has grown each year since 1951, with a particularly large increase in the last three years. Waterworks contractors had been rising in number faster than firms in the sewerage field, but this growth trend leveled off in 1955.

Contractors operating in the earthwork and waterways market (mainly dams and river and harbor development) have grown in number every year since 1951.

Continued on page 32

It used to take 90 minutes

With old cleaning and washing methods, it took an entire 7½-hour day to process a fleet of five school buses — an average of 90 minutes per bus. That was before the school board bought a Turbo Steam Cleaner. Now all five buses are washed and cleaned in less than the time it used to take for just one bus — an average of 17 minutes per bus with the Turbo.

For every cleaning, degreasing or sterilizing need, your No. 1 productive maintenance tool is a Turbo Steam Cleaner — either oil-fired or electric. Compared with conventional steam cleaners, a Turbo cuts detergent costs up to 30% . . . saves up to 20% on fuel costs. Pays for itself in labor savings, reduced down-time, and quicker, more thorough cleansing.

Send now for new illustrated folder with full details. Address Dept. CM-9.

TURBO
Steam Cleaners

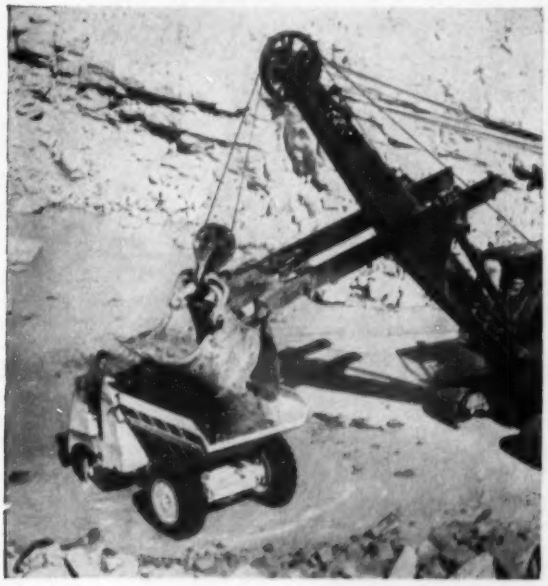
TURBO MACHINE COMPANY • LANSDALE, PA.

Dump in *one second* with Dumptor®

On the above operation, Koehring Dumptor drives up to the hopper, body forward. Operator trips the body-release lever, and *gravity* tilts the 6-yard body 70 degrees. One second later the load is out, and Dumptor is on its way back for the next load. Because there is no waiting for slow-acting body hoists, *gravity-dumping* saves 15 to 25 seconds on every round trip. This adds up to a substantial increase in extra yards per hour. For instance — take a typical 1,000-foot haul, where you normally would make 16 trips an hour. By saving an average of 20 seconds dump-time on each trip, Dumptor gains 320 seconds, or 5.3 minutes more productive haul-time an hour. You get 17½ trips, instead of 16. This, alone, adds 9% to hourly production. What's more, there are no expensive hoist-replacement parts, or hoist maintenance time. *Gravity-dump* never wears out, never balks. You get the same one-second dumping *every time,* under heaviest loads, in all temperature extremes. Better check what this can mean in lower costs, and increased production on your hauling operations. Get the complete Dumptor story from your local Koehring distributor. *Call him today.*

Plenty of power on the haul — You get better than 6 h.p. for every ton of loaded weight when you haul with heavy-duty Dumptor. That's why it accelerates fast, pulls through soft ground, up ramps and grades with less shifting — climbs 24% grades fully loaded. When hauling heavy materials, extra horsepower means extra load-carrying capacity.

No-turn shuttle hauling — Dumptor solves problems of operating in tunnels, along overhead trestles, or narrow haul roads. There is no need to turn, because it travels with equal ease, power and speed in either direction. No-turn hauling offers a big production advantage, too. Every turn saved cuts 15 seconds off cycle time, increases output.



Easy-loading target — Big, 64 square-foot body opening permits loading Dumptor over the side or either end. This saves spotting time, reduces spillage. Heavy duty body is built for rock. Top edge and bottom are box-beam constructed. Sides and ends are rib-reinforced. In fact, Dumptor has a ton of strength for every ton of payload capacity.

Time-saver on stockpiling — Dumptor puts stockpiling on a fast shuttle-haul basis — eliminates turning on top of pile. Notice how instant dumping action kicks the load out over edge of pile — saves a lot of dozer clean-up. Free-swinging kick-out pan breaks load suction in wet, sticky materials, bolts down to floor when handling rock.

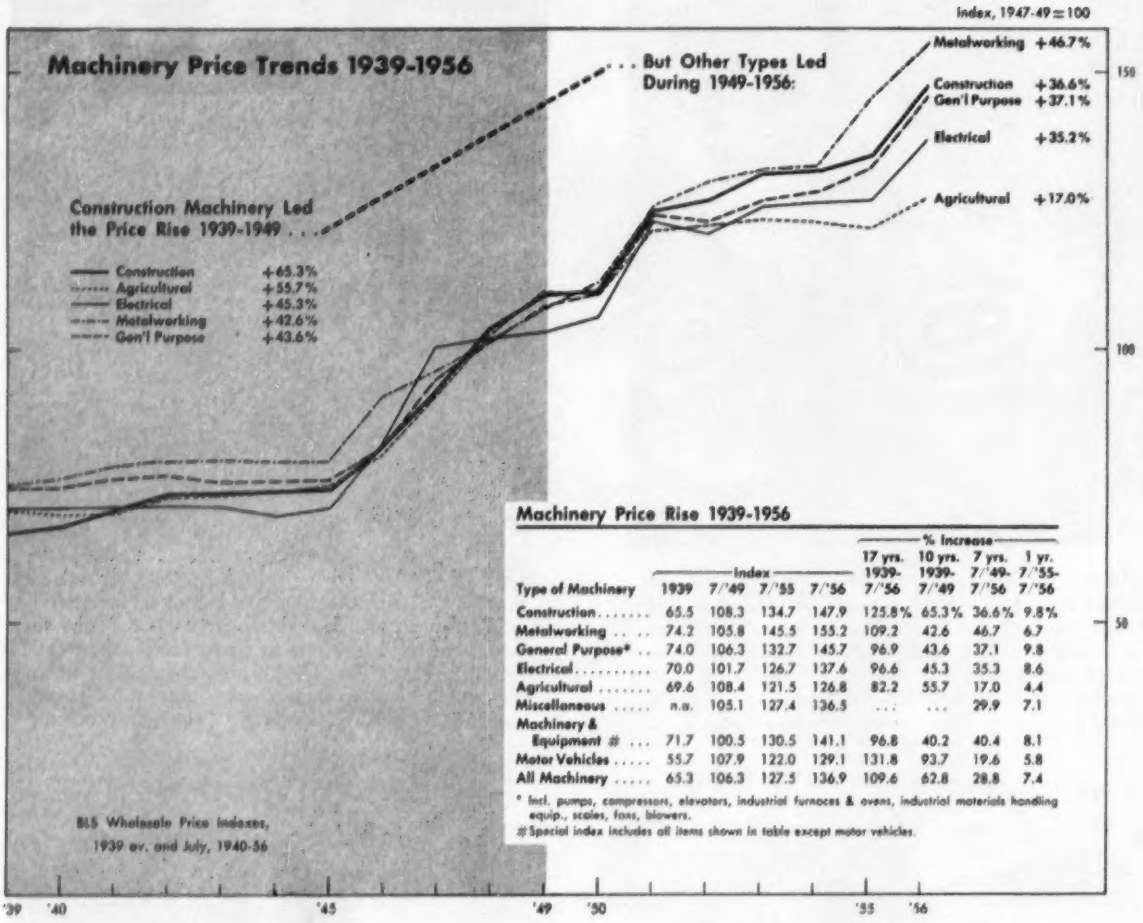
KOEHRING COMPANY, Milwaukee 16, Wis.

Subsidiaries PARSONS KWIK-MIX • JOHNSON KOEHRING-WATEROUS LTD.

KOEHRING HEAVY DUTY

2541

IT'S YOUR BUSINESS . . . continued from page 29



Machinery Price Rise 1939-1956

Type of Machinery	Index 1939	Index 7/'49	Index 7/'55	Index 7/'56	% Increase 17 yrs. 1939-7/'56	% Increase 10 yrs. 1939-7/'49	% Increase 7 yrs. 7/'49-7/'56	% Increase 1 yr. 7/'55-7/'56
Construction	65.5	108.3	134.7	147.9	125.8%	65.3%	36.6%	9.8%
Metalworking	74.2	105.8	145.5	155.2	109.2	42.6	46.7	6.7
General Purpose*	74.0	106.3	132.7	145.7	96.9	43.6	37.1	9.8
Electrical	70.0	101.7	126.7	137.6	96.6	45.3	35.3	8.6
Agricultural	69.6	108.4	121.5	126.8	82.2	55.7	17.0	4.4
Miscellaneous	n.a.	105.1	127.4	136.5	...	...	29.9	7.1
Machinery & Equipment #	71.7	100.5	130.5	141.1	96.8	40.2	40.4	8.1
Motor Vehicles	55.7	107.9	122.0	129.1	131.8	93.7	19.6	5.8
All Machinery	65.3	106.3	127.5	136.9	109.6	62.8	28.8	7.4

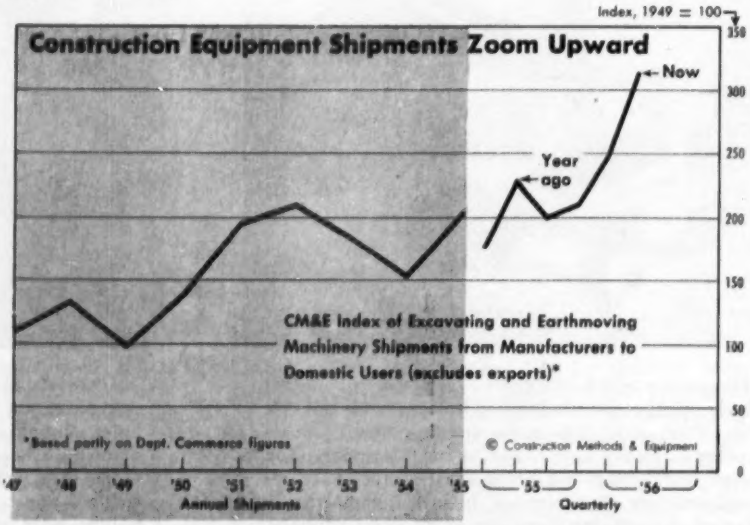
* Incl. pumps, compressors, elevators, industrial furnaces & ovens, industrial materials handling equip., scales, fans, blowers.
# Special index includes all items shown in table except motor vehicles.

Equipment Prices Keep Rising

Construction machinery prices increased a thumping 9.8% on the average during the 12 months ending July, 1956, according to the Bureau of Labor Statistics Wholesale Price Index for major types of machines and equipment.

This means that contractors now have to spend more working capital for equipment than ever before. Contractors' costs are also affected by the higher prices of new equipment, though greater productivity of many new rigs offsets part of the difference.

The sharp uptrend in construction equipment prices is fairly typical of what has happened to most types of industrial machinery. The chart above shows that construction equipment makers are not alone when it comes to raising prices. In fact, they have done a better job in holding down the price rise since 1949 than makers of some types of industrial equipment.



BOOMING CONSTRUCTION EQUIPMENT SALES have pushed CM&E's Index of Domestic Shipments to its second consecutive quarterly record. The second quarter index shot up to 313, 26% above the first quarter high and a thumping 37% over the second quarter of last year. Equipment makers expect new orders to keep rising through the second half of 1957, according to the McGraw-Hill Economics Dept. forecast.

HERE'S YOUR ASSURANCE POLICY FOR LOWEST FLEET OPERATING COSTS

Now PURE puts more pay-off in your preventive maintenance with a

NEW COMPLETE PURE-SURE USED OIL ANALYSIS PLAN

Cuts your fleet mileage costs by telling you what to do to reduce downtime and overhauls

Now at last here's an assurance policy that helps your Preventive Maintenance efforts pay off big in reduced fleet operating costs. It's the new complete *Pure-sure Used Oil Analysis Plan*—another industry first from Pure Oil.

Actually, the Pure-sure Used Oil Analysis Plan is twofold in scope, consisting of Lab Checks and Spot Checks on your used crankcase oil. This new Pure-sure service tool will enable you to reduce downtime maintenance and repair costs six ways:

1. The "Lab Check" of your used oils tells you of the general mechanical condition of your engines and gives you a check on how your P.M. System is working.
2. The "Lab Check" reveals conditions that reduce the engine life and cause premature failures which result in road calls and unscheduled downtime.
3. The "Lab Check" points up conditions that result in excessive fuel and lube expenses.
4. The "Spot Check" of your used oils quickly tells you when to drain the oil from each unit at the moment it needs changing rather than on some set time or mileage basis.
5. The "Spot Check" made on a day-to-day or trip basis will indicate sudden changes in engine condition that would cause breakdown if not corrected.
6. The "Spot Check" will show up leakage from the cooling system into the crankcase in time to repair leaks before engine parts are ruined.

Yes, the Pure-sure "Lab Check" and "Spot Check" Used Oil Analysis Plan is the "stitch in time that saves nine."

Best of all, the *Pure-sure Used Oil Analysis Plan* is FREE to PURE Fleet customers. But you'll know what it's really worth by the money you save in operating costs.

LAB CHECK

Discovers hidden engine troubles *before* they cause downtime and costly repairs

A staff of trained PURE laboratory technicians run more than a dozen checks on every used oil sample you send us. Then a highly skilled automotive engineer is assigned to the interpretation of the results of your sample to detect hidden engine troubles. And from their findings they can give you valuable information that will help you

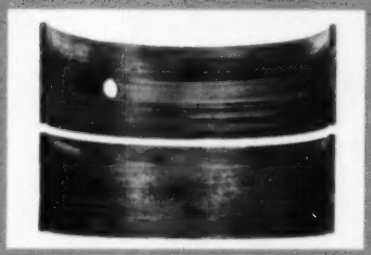
- INCREASE ENGINE LIFE
- CUT OIL COSTS
- CUT FUEL BILLS
- PREVENT FUEL DILUTION PROBLEMS
- PREVENT EXCESSIVE ENGINE WEAR
- PREVENT MANY ON-THE-ROAD ENGINE FAILURES
- USE OIL FILTERS MOST EFFECTIVELY

SPOT CHECK

Great new "Spot Check" Analysis confirms maximum safe drain periods in two minutes

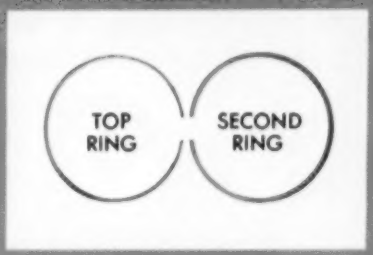
PURE'S new "Spot Check" enables you to tell how dirty your crankcase oil is—in just two minutes. It gives you more for your oil dollar by establishing the maximum safe drain period for each of your fleet units. And it protects your engines from damage by letting you know when crankcase oil can no longer be used without risk. Comparisions of spots from the same engine over a period of time give warning of trouble-making conditions that may cause expensive repairs. It's as easy to use as a dipstick is to read and anybody working in your shop can become an expert.

PURE'S "Lab Check" extends time between your engine overhauls by foreseeing this kind of trouble

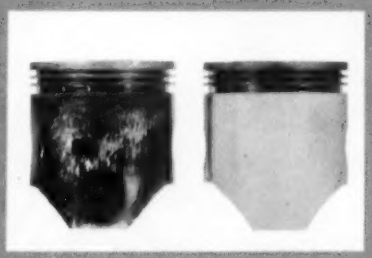


Pure's "Lab Check" Analysis will show traces of bearing metals in the used oil in time to prevent complete bearing failure or crankshaft scoring like this one, or excessive engine wear caused by metal fragments in oil.

Excessively high temperature or dirt can cause damage like this piston failure. Such conditions can be exposed in advance by "Lab Check" Analysis.



Dust wore out this set of piston rings in 6,000 miles. Dust and fine iron particles in the oil revealed by "Lab Check" Analysis would permit operator to correct the trouble long before the actual failure.

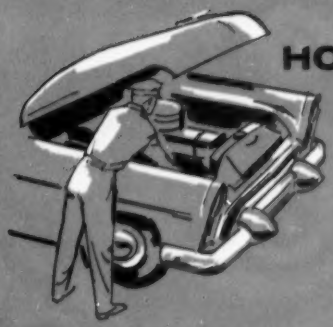


These varnish deposits were caused by a poorly ventilated crankcase, a condition that could have been spotted and corrected by "Lab Check" Analysis.

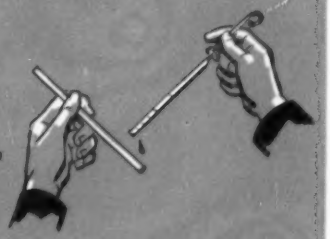
Excessive fuel dilution can cause scored cylinder walls and excessive wear of other parts as well as reduce gasoline mileage. "Lab Check" Analysis will point out this trouble-maker well in advance of serious engine damage.

Clogged filter elements can't protect the engine parts from wear. Use "Lab Check" Analysis to detect this condition and help you increase engine life.

HOW IT WORKS



1. Make sure oil sample is hot. Take sample right after a run or if oil is cool run engine prior to test.



2. Withdraw dipstick and transfer a drop of oil to sampling rod.

3. Place drop of oil on special oil test paper from sampling rod and allow to spread.

4. Compare oil spot with representative spots on "Spot Check" folder. Follow instructions under matching sample to see if oil needs changing. If radical deviations are noted in oil spots from earlier checks, drain oil and send in pint sample for "Lab Check" analysis.

START CUTTING OPERATING COSTS NOW WITH THE NEW PURE PLAN!

Now's the time to start cutting your fleet mileage costs. And it's this easy with the new PURE Plan:

1. Get a PURE "Lab Check" Analysis of a cross section of your fleet. This "Lab Check" will tell you of general conditions that (1) may be costing you many dollars in fuel and lube expenses and (2) may lead to unexpected road breakdowns. Then your men can handle any necessary maintenance work long before it reaches the critical stage.

2. Use the PURE "Spot Check" on all engines to learn when the oil should be changed and to get other inside information. Radical changes that show up in "Spot Check" Analysis will be the tip-off that an engine needs special attention. Follow up with a "Lab Check" Analysis to find out what has gone wrong.

Count on your local Pure Oil Representative to put the new PURE Plan in operation.

Here's the product that gives you full benefits from the PURE Plan!

PUROL
HEAVY DUTY
MOTOR OIL

Made especially for tough truck use

This is the product—Purol H.D., the truck-tested oil—that pairs up with the Pure-sure Used Oil Analysis Plan to cut your fleet operating costs to a new all-time low. This rough, tough, friction-fighting heavy duty motor oil is made especially for truck engine service! It was designed from crude oil to crankcase to give better performance and to cut both lubrication and maintenance costs.

Here's what this great oil does for you:

- Helps your hard-working, heavy-duty gasoline and diesel engines deliver all of the horsepower built into them—because it keeps your engines clean and fights friction.
- Provides more miles between overhaul jobs because its tough film keeps engine wear down.
- It is economical to use. Thousands of fleet operators have found they have to add less Purol Heavy Duty Motor Oil between changes.

For full information on the Pure-sure Used Oil Analysis Plan and this truck-tested motor oil call your local Pure Oil Representative today.

THE PURE OIL COMPANY, DEPT. 1652
35 EAST WACKER DRIVE, CHICAGO 1, ILLINOIS

Without cost or obligation, please send information on obtaining a Pure-sure Used Oil Analysis for one of my fleet units.

Name_____

Title_____

Company_____

Street_____

City_____ Zone____ State_____

BE SURE PURE WITH PURE

Be sure with PURE

626

This 25-ton truck crane travels without permit

New Michigan strips to 41,500 lbs. gvw

1 **Every truck crane user** has the problem of meeting highway weight limits, whether he drives over superhighways, or country roads.

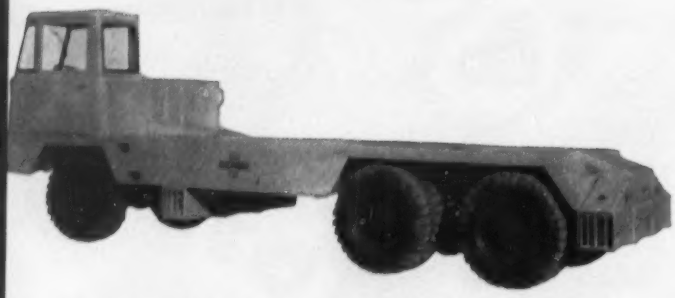
2 **To prepare *this* crane** (a *new* MICHIGAN Model T-24) for weighing, all that had to be done was remove counterweight and rear outrigger under power, then un-pin boom.

3 **Rear tandem axle weighs** in at 32,000 lbs. . . . front axle, 9,500 lbs. Total gross, 41,500 lbs., is well within highway weight limits.

4 **After noting overall width** of under 8 feet, the "go" signal is flashed (left) and the MICHIGAN Model T-24 truck crane moves off the scale and is on its way without delay.

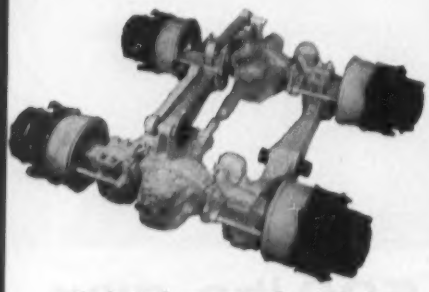
Turn page for more details on this all-new Michigan 25-ton truck crane . . . . . .

New Michigan 25-ton truck crane . . . .

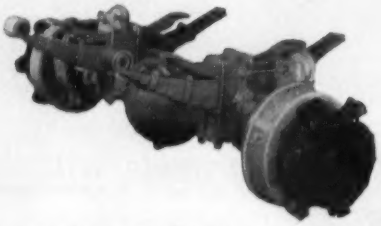


All new truck has been designed and built by Clark especially for truck crane service. The truck alone weighs 27,000 lbs. It gives you, as standard equipment, all-wheel 6 x 6 drive *and* all-wheel air brakes. For tough going, it has a low forward speed of 1.6 mph. . . . for fast travel, its top speed is 39 mph. Big 11.00-20, 12 ply tires provide plenty of traction and flotation.

Man-ten steel frame—To stand up under the shocks and strains of heavy-duty truck crane service, the Model T-24 frame is built of high-strength Man-ten alloy steel. Side-channels and cross-members are welded into an integral unit by the most up-to-date welding technique—deep penetration, submerged-arc welding.



Clark tandem rear axle—Why is a Clark planetary wheel tandem axle the best for truck crane service? Clark planetary wheel axles, with 3-to-1 reduction in the wheel hub, reduce torque on axle shafts by 70%. With the final reduction in the hub, *axle breakage is eliminated.* Static load rating: 90,000 lbs.



Clark steering drive axle eliminates axle breakage problems in front, too. This axle is the result of over 50 years experience by Clark in the design and manufacture of heavy-duty axles. You can depend on it for long, trouble-free service. All gears are sealed, run in a bath of oil. Static load rating is 30,000 lbs.

Unmatched service accessibility is carefully built into the new MICHIGAN truck engine. A handy door allows the operator to walk in and inspect air cleaner, battery, and oil filter. Gasoline engine is a Waukesha 525 cu. in. unit, developing 160 hp at 2400 rpm. Waukesha diesel is optional.

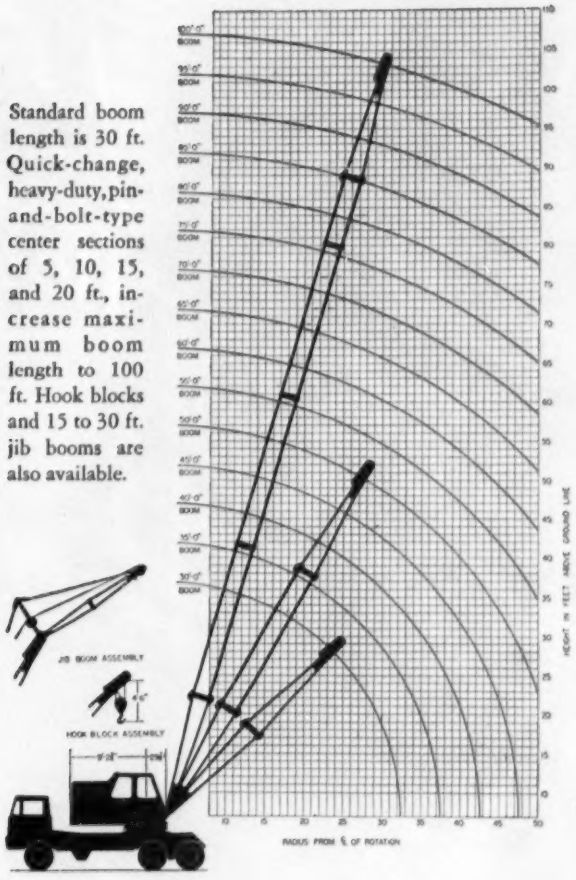
Big all-new cab, newly designed, provides superb all-around vision through 2,775 square inches of safety-glass window area. Windows slide back to provide plenty of ventilation. Operator can adjust foam-rubber seat. Hydraulic booster steering is standard. Instrument panel tilts forward for easy access to gauges.

Removable rear outrigger—Rear outrigger box is easy to remove when stripping crane for highway travel. All you do is support outrigger box with hoist line, then take out two bolts and two pins. Outriggers, made of 12″ x 40 lb. reinforced I-beams, roll out easily on stainless-steel bearings.

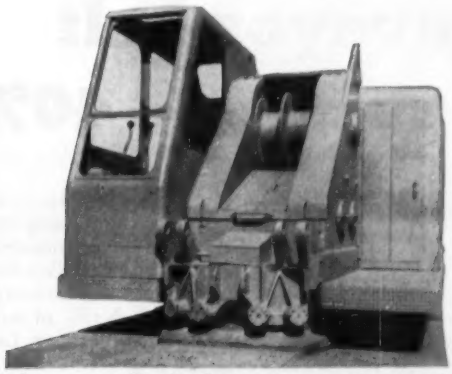
Clark power train—From engine to tires, power flows through parts engineered and matched to each other by Clark. Heavy-duty Clark five-speed transmission and two-speed transfer case combine to provide 10 speeds forward, and two reverse—from 1.6 to 39.0 mph. For easy highway travel, front axle drive can be de-clutched.

designed with features you asked for

Standard boom length is 30 ft. Quick-change, heavy-duty, pin-and-bolt-type center sections of 5, 10, 15, and 20 ft., increase maximum boom length to 100 ft. Hook blocks and 15 to 30 ft. jib booms are also available.



Before the new MICHIGAN excavator-crane was even sent to the drawing boards, hundreds of contractors, quarry owners, mine operators and road superintendents were asked what they thought it should have. Their many suggestions were carefully built into the Model T-24. Such things as a 25-ton lifting capacity. A trouble-free power train with Clark planetary wheel axles, Clark transmission, and Clark transfer case. A 38% increase in motive power. Faster travel speeds. Better visibility. The same ease of air-control MICHIGAN excavator-cranes are so famous for. These features—and many others—were then proved in test models operated on dozens of contractor, quarry and muncipal jobs. Others were run "round the clock" at our proving grounds. Others underwent painstaking laboratory research. Now, all testing is complete and the MICHIGAN Model T-24 is ready to roll. You owe it to yourself to check this new truck crane, firsthand. Our test users did—and, as proof of outstanding performance, a great many have placed orders. These pages show some of the profit-producing features they're getting.



Modern streamlined cab gives operator unmatched visibility, and provides full protection from weather. Engine is cross-mounted and ventilated by louvers in each side and sliding doors in rear. Six big hook rollers are ball-bearing mounted.

Shaft and drums are air controlled. Counter weight slabs weigh 750 lbs. each and are removable by power from hoist drum. Upper mechanism engine, Waukesha with 426 cubic inch displacement develops 104 hp at 1650 rpm. Worm-gear boom-hoist, with power up *and* down, is standard equipment.

For all-around use, crane is fully convertible to ¾ yard shovel, back hoe, magnet, breaker ball, as well as to dragline or clamshell.

Michigan is a registered trade mark of

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 27, Michigan

B.F.Goodrich

B. F. Goodrich conveyor belt doubles production, cuts costs 40%

Nyfil fabrics give belts greater strength, yet cost no more

At this big Pennsylvania plant, limestone used to be hauled to the crusher in cars drawn by a locomotive. But the system was too slow and costly.

A conveyor belt was considered. But the company was afraid that the heavy boulders crashing down on it would break the fabric reinforcement, would soon wear out the belt.

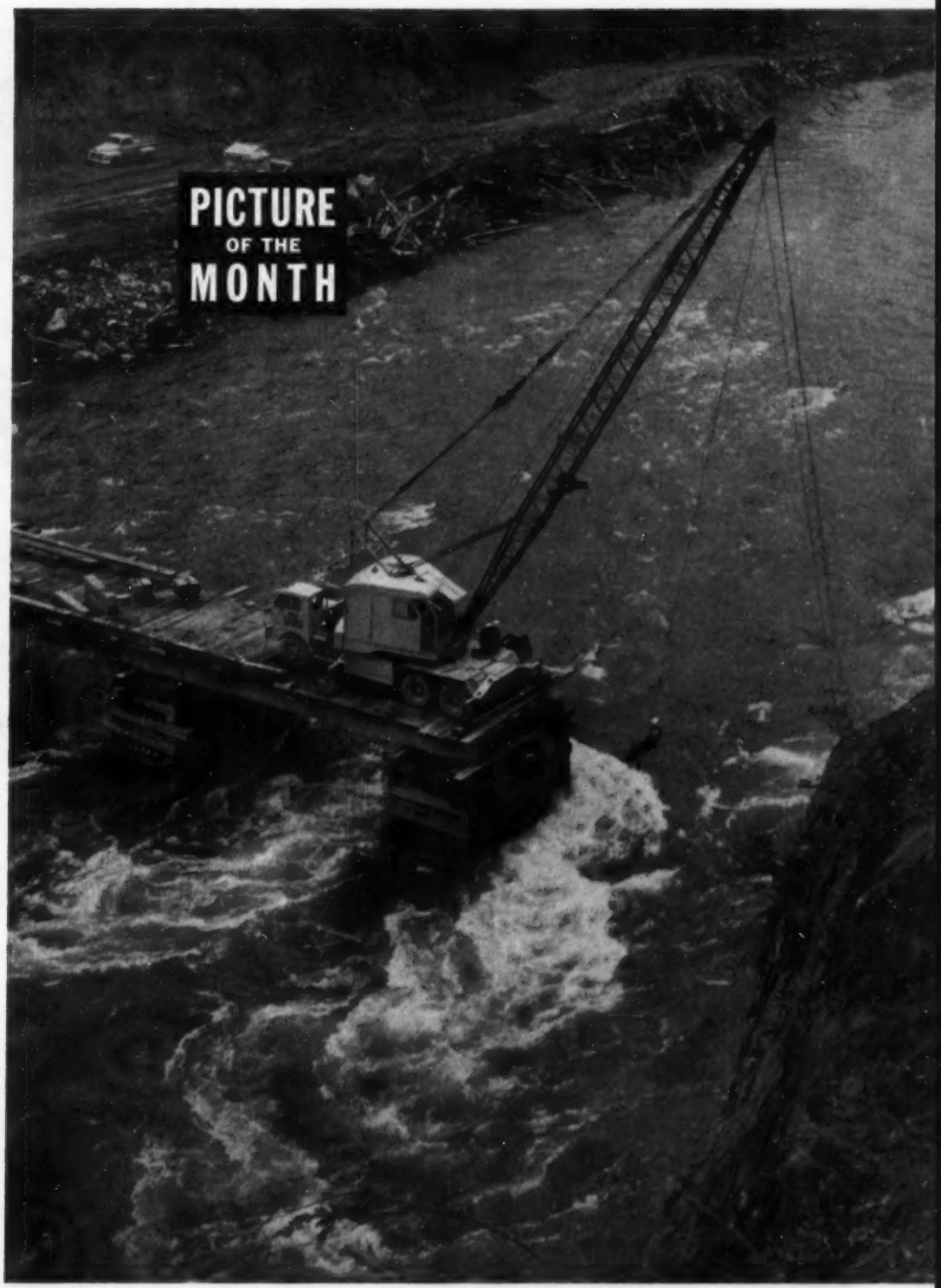
They talked it over with B. F. Goodrich engineers, who convinced them that there was a B. F. Goodrich belt that could take this abuse. The belt they recommended is made of B. F. Goodrich Nyfil fabric, so named because nylon is used as cross threads in the fabric to give extra strength without adding weight. B. F. Goodrich belts made with Nyfil are much stronger and so have greater impact resistance and hold fasteners better than belts made with cotton fabric.

The B. F. Goodrich belt, with Nyfil fabric, had been in use 18 months when the picture was taken, needed no maintenance, looks as if it would last five years more. It has increased production 100%, cut costs 40%, released four men badly needed for other work.

B. F. Goodrich belts, made with nylon-filled fabrics, have been in use many years now and are doing conveying jobs that were once considered impossible. Have your B. F. Goodrich distributor tell you *all* the advantages of belts made with Nyfil, or write *B. F. Goodrich Industrial Products Company, Dept. M-752, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS



Swift Creek Airlift

• Crane swings worker to rock-filled weir in river (concealed by rock ledge at right). Job is the $58.7 million Swift Creek Hydroelectric Project of Pacific Power Light Co. in southwest Washington. Project will include an earth fill dam 2,000 ft long and 510 ft high and a diversion tunnel 2,900 ft long and 32 ft in dia which will be built by Guy F. Atkinson Co., San Francisco.

This network of ramps, takeoffs and highway composes the three mile stretch of New Jersey Turnpike extension worked by Geo. M. Brewster & Son, Inc.

"Flex-plane .....makes the

REMARKABLE SELF-WIDENING FINISHER MAKES SMOOTH WORK OF COMPLEX HOLLAND TUNNEL EXTENSION OF JERSEY PIKE!

▲ Flex-Plane's Triple Lap Frame provides unsurpassed steadiness even at its widest width. Here machine works 23' slab in extended position.

"There's only one machine that could have done this job," states Byron Craig, Paving Superintendent of Geo. M. Brewster & Son, Inc., "and that is Flex-Plane's Self Widening Finisher."

The job Byron Craig was talking about is the Newark Bay-Hudson County Extension of the New Jersey Turnpike, a three mile stretch of ramps, turnoffs, interchange lanes and service area cutoffs that connects the busy toll road with the Holland Tunnel.

"This job was a real challenge," continues Craig, "A typical pour would range from 4' to 14½' to 19', back to 15' - 8", then up again to 23'. The Flex-Plane Self Widener worked these variable width slabs as easily as though it were a straight pour. What's more I find Flex-Plane builds a 'paving man's' machine. It's strong and sturdy at its widest width, and it comes in a width selection that makes sense."

You'll find most leading paving firms own Flex-Plane finishers. It's the most popular finishing machine ever built. If you are in the market for finishing equipment let us put you in touch with a contractor in your area who'll convince you there's absolutely nothing to match it.

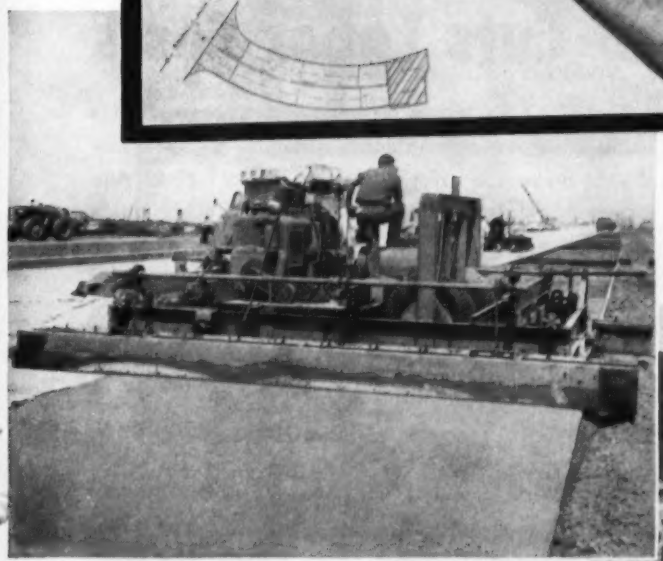
THE FLEXIBLE ROAD JOINT MACHINE CO.

7900 THOMAS ROAD, WARREN, OHIO

10063

WORLD'S LARGEST MANUFACTURERS OF CONCRETE FINISHING EQUIPMENT

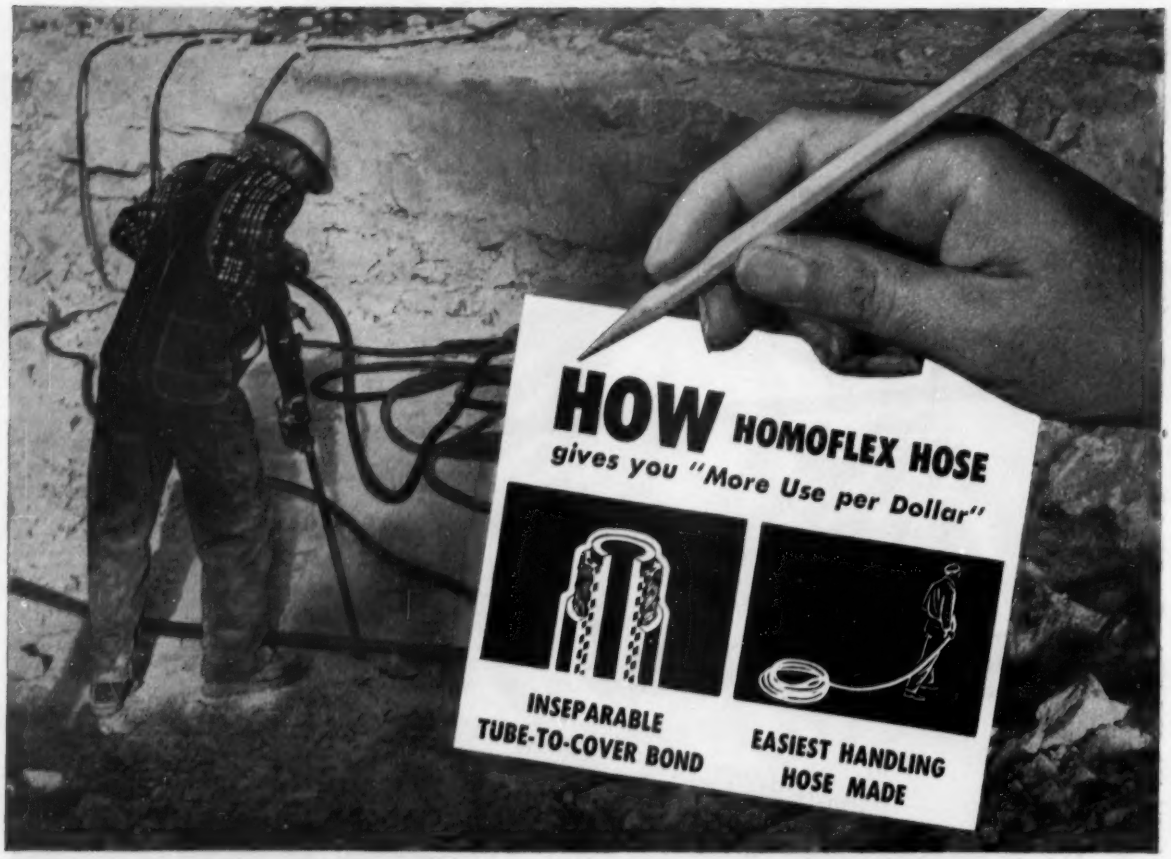
difference"



Byron Craig, Paving Superintendent, shows type of progress chart he used to map pours.

▲ Typical slab section. Note unusual tapering. Brewster was able to maintain above average pour with a single Flex-Plane machine without a spreader.

● Here machine works narrow take off strip in contracted position. Three mile stretch had 10 such strips plus 8 ramps and one underpass. ▶



This Easiest Handling Hose Gets More Work Done–Cuts Labor Costs

Bulk and stiffness have been engineered *out* of this modern hose. The unique construction of Homoflex Hose makes it light, flexible as a rope, yet strong. Made with no pre-set twist, it coils and uncoils *without* kinking. Exclusive R/M engineering creates a homogeneous cover, strength member and tube that are virtually inseparable . . . This hose is easier to handle, yet strong and safe for the toughest jobs!

Homoflex Hose is easier to couple, too, because it has uniform inside and outside diameters. All these features mean that Homoflex Hose lasts longer, gets more work done, handling air, water, other fluids and gases. Ask the R/M representative to show you how Homoflex Hose and other types of R/M hose for general and special purpose use do a better job, longer . . . give you "More Use per Dollar."

RM-618

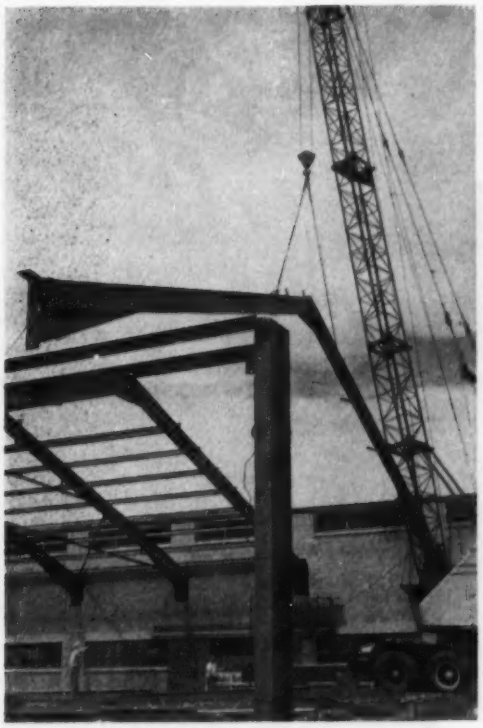
RM

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

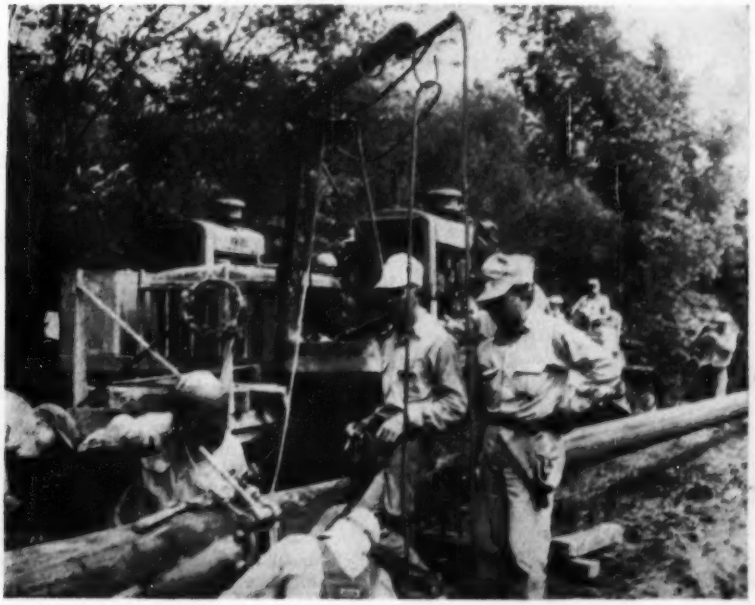
Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

Construction News in Pictures . . .



Easy Expansion

Erecting the frame for an addition to this plant is simply a matter of bolting the steel frame to the old line of columns. Luria Engineering Co., Bethlehem, Pa., designed and fabricated the frames. I. & O. Slutsky, Inc., Hunter, N.Y., is the contractor.



Handling with Care

A special rig, developed by Pittsburgh Plate Glass Co., places big 8x11-ft glass panes for Connecticut General Insurance Co.'s new building near Hartford. Eight rubber vacuum cups grip the pane, and an overhead hoist lifts it to position.

Pipeline for Coal

The first coal pipeline in the U.S. will carry pulverized coal suspended in water 108 miles to a generating plant in Cleveland. Williams Brothers Co., the pipe laying contractor, welds the high tensile steel pipe in 16 passes with Lincoln welders.

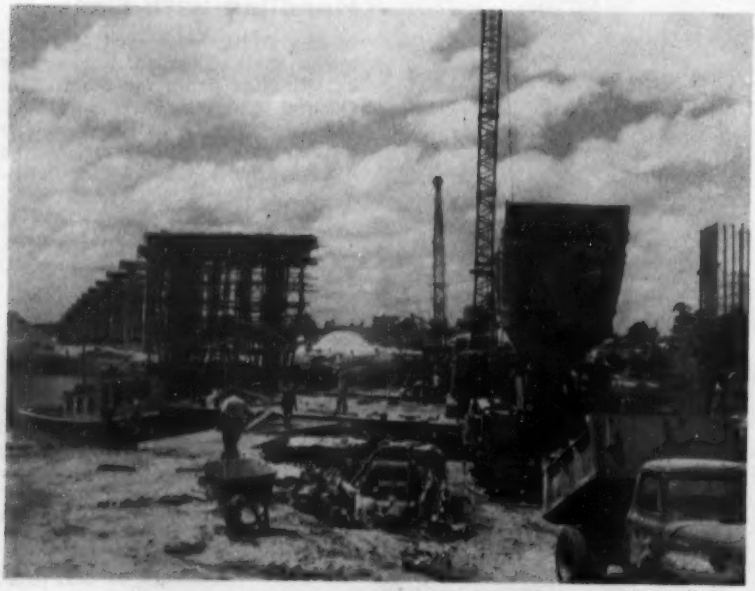
(Continued on next page)

Launching an Island

The second of the radar islands that will guard the Atlantic coast slides into the water. Continental Copper and Steel Industries fabricated the hull; a joint venture of J. Rich Steers and Morrison-Knudsen will erect the tower at Nantucket Shoals.

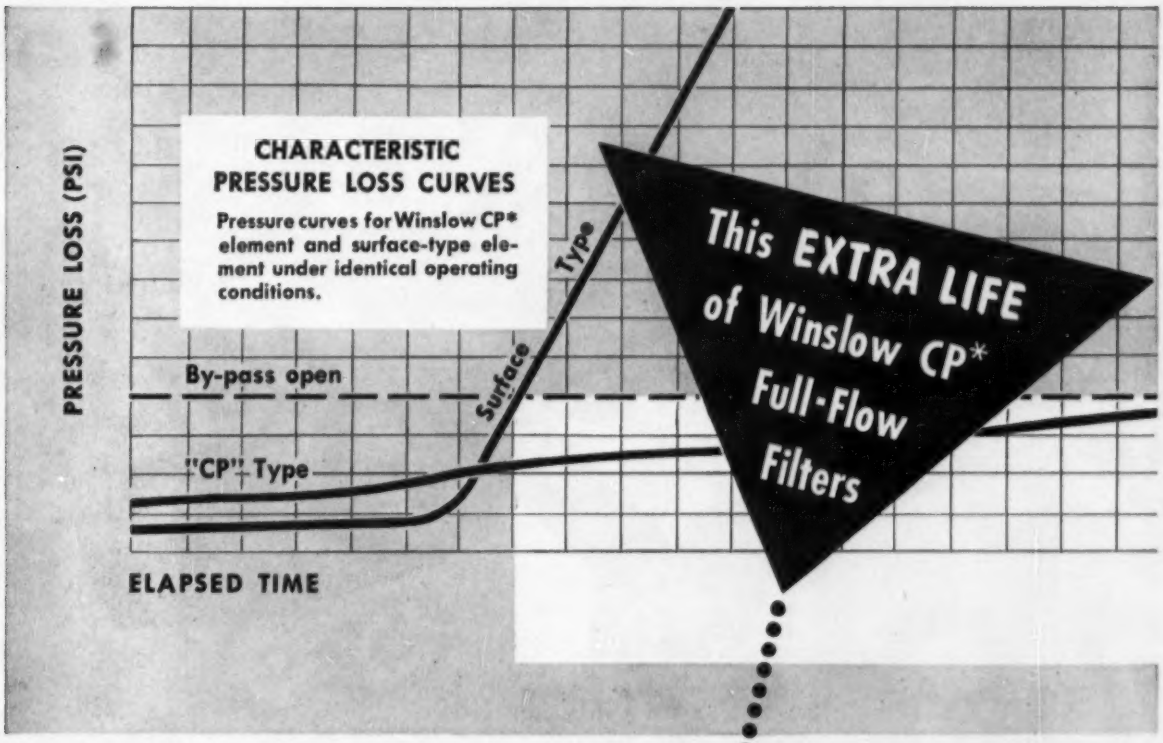
Lift with Care

Despite its 9-ton bulk, erecting this cartouche over the entrance to the Federal Reserve Bank in Buffalo takes skill to avoid cracking or chipping. A 25-ton Lorain truck crane does the job. William L. Crow Construction Co. is general contractor.



Paver Mixes Pier Concrete

A dual drum paver serves as a concrete mixing plant in construction of piers for the 3,000-ft-long St. Lucie Canal Bridge on Florida's Sunshine State Parkway. Paul Smith Construction Co. is contractor. The 108-mi project is scheduled for completion by Jan. 1, 1957.

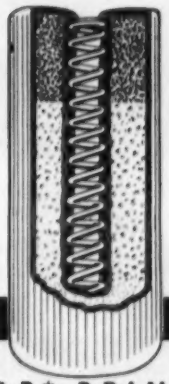

CHARACTERISTIC
PRESSURE LOSS CURVES
Pressure curves for Winslow CP* element and surface-type element under identical operating conditions.
PRESSURE LOSS (PSI)
By-pass open
"CP" Type
Surface Type
ELAPSED TIME
This EXTRA LIFE of Winslow CP* Full-Flow Filters

Saves both the Oil and the Engine

Laboratory tests and operating experience indicate that Winslow CP* filters have as much as 50% more useful life than a surface-type filter. As a result, both the lube oil and the engine are protected beyond normal filter service.

Contractors, for instance, report that useful oil life in diesel-powered equipment has been extended from 80 hours to 300 hours, with Winslow CP* filters.

Most important, engines are protected all the time with Winslow full-flow filtration . . . protected during cold starts, while idling and against excessive dirt . . . protected if a bearing fails. Because of this better oil filtration, engines last longer and require less maintenance. A modest investment in Winslow filters returns substantial dividends.



THE CP* PRINCIPLE

Winslow patented CP* (Controlled Pressure) elements are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil from the filter without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material, as illustrated.

WINSLOW FILTERS **CP is fully protected by patents and trademarks*

Winslow Engineering and Manufacturing Co. **4069 Hollis Street • Oakland 8, California**

"Usable" horsepower replaces engine size as gauge of shovel-crane power

IT's important to judge shovel-crane work potential on the basis of usable horsepower rather than engine size. Proof: size for size, a Link-Belt Speeder delivers up to 40% more horsepower than other machines having the same make and model engine. And greater usable horsepower is bonus power that pays off in easier digging, faster cycles, more production and profits.

The variation in the amount of power a given model engine actually makes available in the form of line pull (or power at the drums) is determined primarily by the net horsepower the engine delivers at the output shaft. Engine Model X, for example, when run at 1200 rpm, develops *75 hp.* At 1600 rpm, it develops *100 hp!* That's a difference of 33% in *usable hp!*

Equipment must be designed and built to handle extra usable horsepower and speeds

Because the Link-Belt Speeder line is industry's most advanced in design—17 new models—it incorporates the latest developments in engineering, metallurgy and fabricating. As a result, every Link-Belt Speeder is an "extra strength" machine—a shovel-crane with the added guts and stamina to take full advantage of the bonus horsepower available (within recommended operating speeds) in any engine.

A Link-Belt Speeder's extra strength is evident in its

MORE USABLE HORSEPOWER permits the operator of this Link-Belt Speeder K-360 to "sock" the bucket into the cut . . . come up with a full load fast, first pass. There's no need to "shave" the bank or back off for fear of stalling.

upper and lower frames. They're all-welded, and by the most modern processes including the submerged arc technique to assure deep penetration. Then, as are all major weldments in a Link-Belt Speeder, frames are stress relieved. This assures greater strength and freedom from dangerous shrinkage strains and hidden stresses that might cause failure and warpage.

Heavier components handle heavier loads

More evidence of a Link-Belt Speeder's extra strength is available upon examination of shafts. They have extra size and heft . . . are made from tough, high-alloy steels and precision-machined. What's more, all shafts are splined for greater strength and less wear . . . maximum power transmission efficiency.

Then, too, clutches are designed and built to handle additional power with ease. They have alloy-cast iron clutch drums (the finest friction material known). Lining material was carefully chosen on the basis of how it would work in conjunction with drum material. This, plus basic design, results in clutches that can consistently take the full operating pressure of the engaging forces with maximum effectiveness and smoothness—but with little chance for uneven wear.

Other noteworthy clutch features: generous size swingers and drum clutches . . . most models have interchangeable clutches within each model . . . and all clutches are self-compensating for heat and normal lining wear.

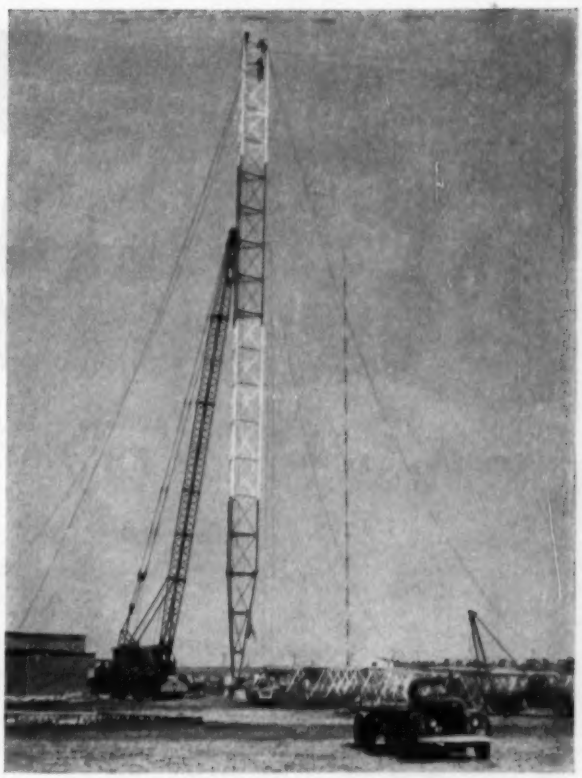
Are you paying for power you never use?

If you don't have a Link-Belt Speeder on the job, chances are you're passing up a great opportunity to increase your production and profits without the need for going to bigger machines. Why not have a talk with your Link-Belt Speeder distributor today? He has many field reports to back up the Link-Belt Speeder usable horsepower story. Or write—LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA. 14.210

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

POWER HYDRAULIC CONTROLS, a Link-Belt Speeder exclusive, are fingertip operated. The operator gets fast, positive, easy response and perfect "feel" to take full advantage of his machine's added usable power . . . further increase daily output.



EXTRA POWER MEANS EXTRA SAFETY IN CRANE WORK. Large, heavy loads can be handled more safely . . . at any speed and with greater speed range selectivity.

FASTER MACHINE MOVEMENT is another benefit resulting from greater usable horsepower. This Link-Belt Speeder heavy-duty ¾ yard LS-88 has the extra power not only to dig, but also to swing, hoist, dump and travel.

A satisfied customer writes about JOY LIMBEROLLER Belt Conveyor Idlers:

Early in 1955 we decided to try four Joy Limberollers on the No. 1 slope conveyor from the primary gyratory crusher in the quarry.

This conveyor carries the product of the primary crusher set at about 5', on a 12 degree slope and running at about 450 feet per minute. Originally designed for 400 ton per hour capacity; there have been surge loadings of twice this amount.

While the balance of the conveyor system is the enclosed gallery type; the No. 1 slope conveyor was not fully completed before the start of production season and consequently ran all year exposed to all kinds of weather

The Limberollers have carried a few hundred thousand tons of heavy stone with absolutely no maintenance. On the basis of this record we have placed repeat orders.

Richard Robinson

Richard Robinson, Treasurer
MASSACHUSETTS BROKEN STONE COMPANY

A Limberoller consists of rubber discs molded to a flexible cable which is freely suspended from a bearing at each end . . . a single roll forming its own trough and turning on its own axis.

The Limberoller is a new type of belt-conveyor idler that has been setting length-of-life records wherever used . . . over *twelve times* the service life of conventional idlers in many applications. It has proved extremely efficient in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super-phosphate, ammonium sulphate and sticky fertilizers.

The Joy Limberoller resists dust, abrasion, corrosion and material buildup. Resilient molded discs on a flexible steel cable conform to load and cushion the belt. Only two bearings are used and these are up out of the dirt zone. Get details from *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ont.*

LIMBEROLLER
THE IDLER WITH FLEX APPEAL

Write for FREE Bulletin 114-23

It gives complete information on the unique Limberoller Idler, and we'll be glad to supplement it with engineering assistance on your particular problem.

Consult a Joy Engineer

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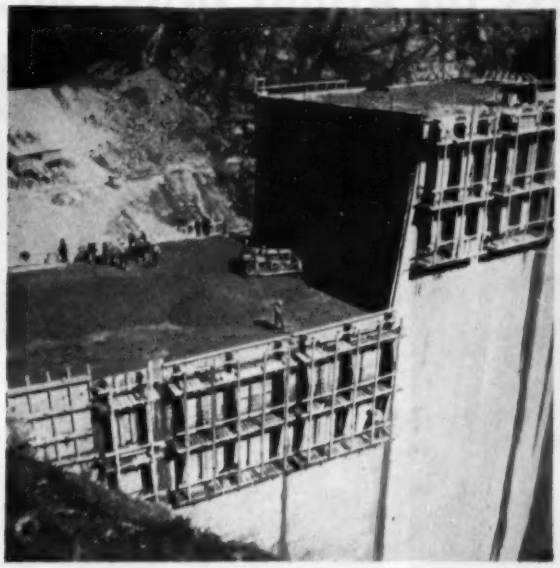
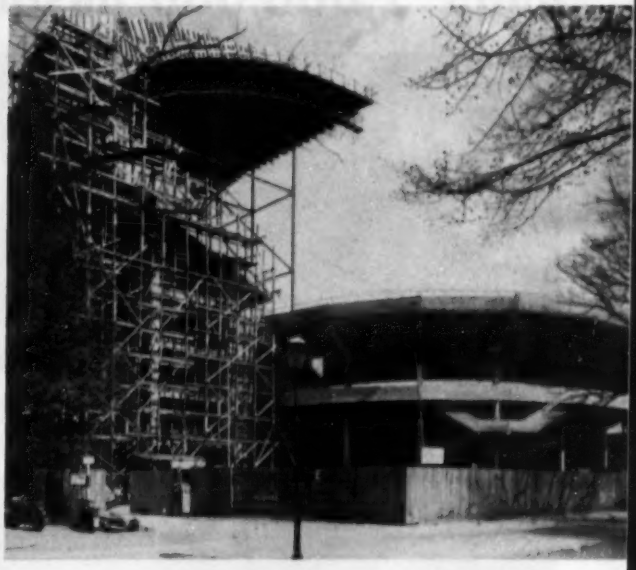
JOY

SINCE 1851—OVER 100 YEARS OF ENGINEERING LEADERSHIP

Construction 'Round the World . . .





In Switzerland (above)

Concrete for Mauvoisin Dam in the Swiss Alps has a water-cement ratio of only 0.6 so it is possible to spread it with a Cat D4. Concrete is placed in 10-ft lifts in aluminum forms 20 ft long with studs 8 ft on centers. Contractor on the job is a joint venture of five Swiss firms.

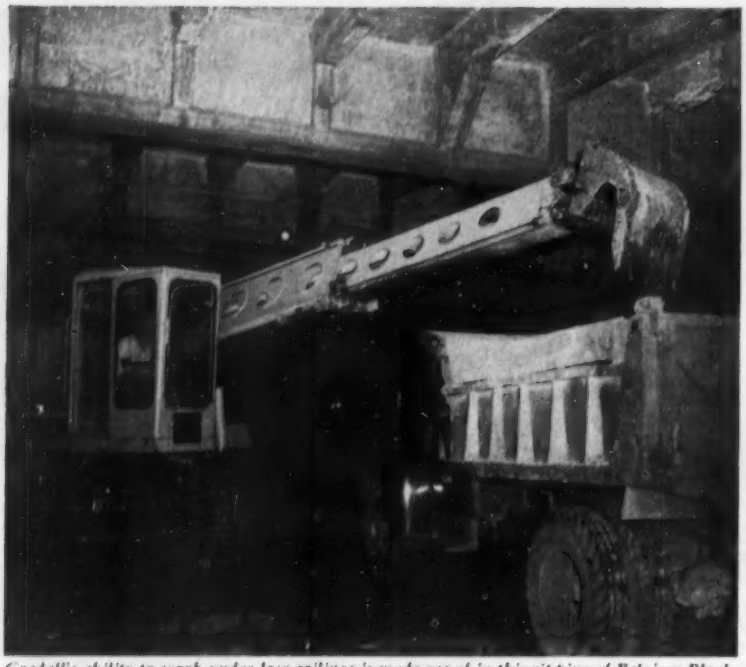
In Brazil (below)

The Peixoto hydroelectric project may prove to be the first big step in a TVA-like development of the Rio Grande valley. The Brazilian subsidiary of American & Foreign Power Co. is building the project with Ebasco Services, Inc., as consulting engineers. Cost is $37 million.

In Denmark

Concrete shell cantilevers out 70 ft to shelter spectators in Copenhagen's new Athletic Park. Contractor Christiani & Nielsen, Ltd., formed for the shell from scaffolds erected on rails in the grandstand so that the forms could be rolled easily from one pouring position to the next.

Gradalls® handling "Dime Store" jobs build $2,000,000 business for Arnolt Bros., Inc.



Gradall's ability to work under low ceilings is made use of in this ripping of Belgium Block paving from an approach to New York's Holland Tunnel.

Gradall economically spreads an even 3-inch layer of slag on an oil refinery's storage tank fire wall.

Gradall digs for a pipe run in one of the country's largest refineries. Its telescoping boom enables the operator to easily reach in under pipe bent.

"Our diversified contracts require equipment that can handle many different types of work. Multi-purpose Gradalls perform well on any project—and pay for themselves in 18 months or less", reports President Fred Arnolt, Jr.

Four years ago, when the principals of this small but progressive dirt-moving organization decided to diversify their activities in order to prosper and grow, equipment selection became an important item.

A magazine advertisement for the multi-purpose Gradall gave them the idea of building their equipment fleet around one machine. As Vice President Marty Jessen tells the story, "The ad claimed that this machine would do 'a dozen' jobs. That was right up our alley. We took the gamble and it has paid off for us—time and time again."

In addition to its contracting business, Arnolt also rents equipment to other contractors. Most of these rentals have been from their fleet of 10 Gradalls. That's because users everywhere know of the machine's extreme versatility and ability to handle such a wide variety of work.

This year Arnolt's business in both the building and utility fields will total over $2,000,000—and prospects look even better for 1957. Secret of their substantial growth can be attributed to the use of multi-purpose, mobile equipment—like the Gradall.

Gradalls do all these jobs for Arnolt Brothers, Inc.

- Highway subgrade excavation
- Ditch cleaning
- Pipe placing
- Trench excavation
- Materials handling
- Pavement removal
- Frost breaking, for pipeline or trench
- Fine grading and slope dressing
- Backfilling
- Fire-bank construction
- Crane work and other lifting
- Pipe stringing
- Ditching
- Sheetpile driving

® Reg. U. S. Pat. Off

CRAWLER-MOUNTED GRADALL | SELF-PROPELLED GRADALL | RAILROAD GRADALL

Gradall
DIVISION OF WARNER & SWASEY Cleveland
PRECISION MACHINERY SINCE 1880

Distributors in over 75 principal cities in the United States and Canada

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Construction Methods AND EQUIPMENT

SEPTEMBER, 1956

VOLUME 38 • NUMBER 9

HENRY T. PEREZ, Editor

Contractor Failures

"I SOLD MY EQUIPMENT—lock, stock, and barrel—because new fellows coming into this business are working below cost." So replied a Connecticut contractor to one of our recent surveys. The same complaint comes from all sections of the country.

Chances are that more outfits will be forced out of contracting for this and a variety of other reasons. Chances are, too, that many of them will be today's "new fellows working below cost." While they're around, these menaces can surely make it tough on even the most experienced contracting companies.

Contractor failures for the first seven months of this year already are up 34% over the corresponding period of 1955. And their dollar liabilities are more than $55 million, a jump of 27%.

What can you do to avoid becoming one of these unpleasant statistics? Well, the main thing is to find out what your costs really are. Then, unless you're planning to commit corporate suicide, don't bid below them. It should be unnecessary to point out that, barring a miracle, no amount of below-cost work will turn a profit. But too many contractors expect that miracle.

Too many contractors seemingly refuse to face up to the fact that their costs of doing business are rising. Equipment prices are going up (page 24). Yet many outfits fail to make proper provision for future, more-expensive replacements in their current machine inventory. Unless you are realistic about this, you are likely to find that your equipment is worn out and there is not enough money on hand for new machines. And long gone are the lush post-war days when used equipment could be traded in for more than its original price.

The cost of money is going up also—interest rates have just been raised again. It is the rare and fortunate contractor who never needs a bank loan.

And in a tight money market such as we have now, increased working capital is going to be harder to come by. So you may find yourself overextended, your money tied up in partially completed work, and no cushion to fall back on should one of the jobs turn sour.

Implicit in all this, of course, is that you must have an adequate system for keeping detailed cost records. It must be one that will give you actual costs and cost trends as the job progresses, while there is still time to take remedial steps should they get out of line. Final costs compiled after the work is completed are interesting as a comparison to the estimate and valuable as a guide to future bidding. But they won't help you much with the contract they were made on.

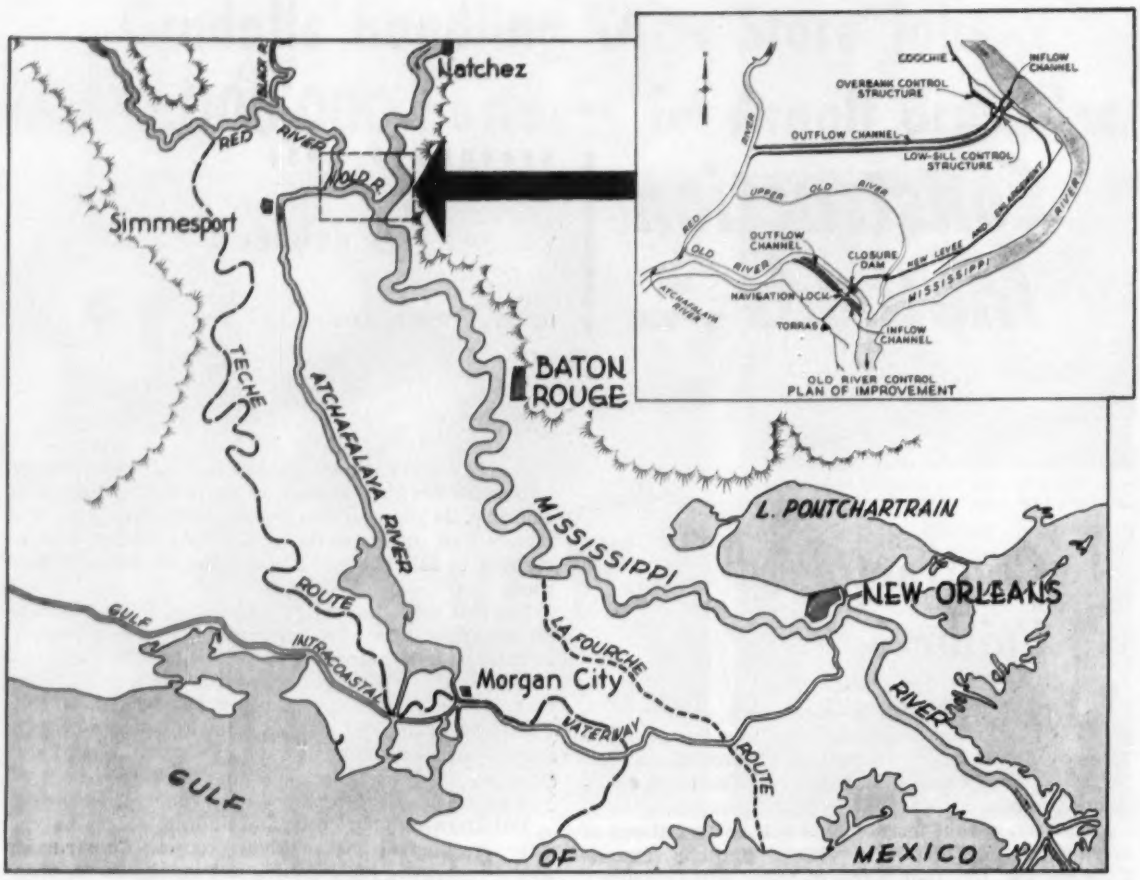
But knowing your costs, and bidding accordingly, is only one part of the survival picture. Construction know-how, good job planning and management, proper job planting, adequate financing—all are essentials of successful contracting. These factors are not the exclusive property of the old-time outfits however. And new fellows coming into the business must take them all into account unless they want to wind up in the list of contractor failures.

Contractor Failures—First Seven Months

Reported by Dun and Bradstreet

	Number		%	Liabilities('000)		%
	1956	1955	Chg.	1956	1955	Chg.
U.S. Total	1,006	751	+34	$55,063	$43,462	+27
BY TYPE OF CONTRACTOR						
General building contractors	381	244	+56	30,114	24,100	+25
Building sub-contractors	569	465	+20	22,260	17,052	+31
Other contractors	56	42	+33	2,689	2,310	+16
BY SIZE OF LIABILITY						
Under $25,000	517	421	+23	5,769	4,862	+19
$25,000-99,999	356	247	+44	17,035	11,876	+43
$100,000 & over	133	83	+60	32,259	26,724	+21
BY REGION*						
New England	64	60	+ 7	4,706	3,290	+43
Middle Atlantic	202	147	+37	11,928	7,875	+51
South	149	88	+69	8,398	9,382	−10
Middle West	177	125	+42	8,861	7,940	+12
West of Mississippi	119	61	+95	7,287	5,089	+43
Far West	295	270	+ 9	13,883	9,886	+40

*Approximated by combining Federal Reserve Districts of original data.



• **OLD MAN RIVER** during the past ten centuries has displayed an unusually fickle character. At least twice he has changed course drastically, shown by broken lines above—and he's about to do it again!

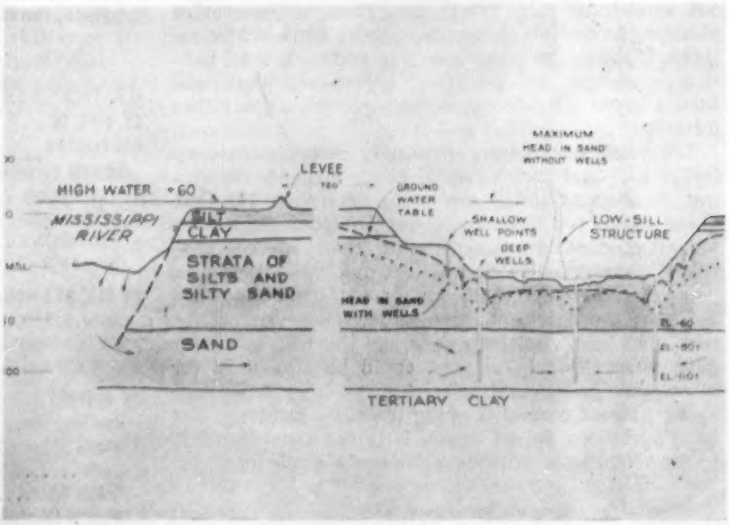
Only 200 mi upstream from New Orleans in flat alluvial delta land, a river which has just recently come into its own threatens to capture the Mississippi. Actually only a short connecting channel, the Old River is already tapping one quarter of the Mississippi and sending it down the Atchafalya River, shortest and steepest route to the Gulf. Within ten years the Mississippi is expected to split at the Old River, and not long after it could leave its present course entirely.

The effects on downstream centers would be disastrous. Salt water would contaminate both industrial and domestic water; navigation, flood-control, and communication structures would be obsolete, and the entire area would be knocked out of equilibrium.

To prevent the diversion, the Corps of Engineers has started on a $50 million plan to block the Old River and replace it with a controlled channel 10 mi upstream. It includes a mechanically operated low-sill control structure, enlarged levees, and a navigation lock on the Old River.

To build Mississippi control structure...

Deep Wells Dry



DEWATERING of 40-acre excavation is handled by wellpoints and deep wells. Bottom of hole is 90 ft below high river. Ratio of horizontal scale to vertical is 4½ to one.

HUGE MANIFOLD receives water from wellpoints and deep wells and discharges through 30-in. pipe. One discharge line runs to river and other goes through downstream cofferdam. Note manifold outlets available for connection with future wellpoints.

Excavation

A CLEVER COMBINATION of shallow wellpoints and deep well pumps has taken on one of the biggest dewatering jobs along the Mississippi River. Installed less than 2,000 ft from the banks of the river, the huge system is keeping a 40-acre excavation bone dry. And it needs a capacity of 51,000 gpm to do it.

Cut to a depth of 90 ft below high river level, the big hole will serve as foundation for the new low-sill control structure. (See drawing.) The $10 million job is being handled by F & C Engineering Co. of Houston, Texas and two subcontractors. Joe E. Freund Inc. is doing the excavating and Independent Wellpoint Corp. is dewatering the foundation. Both subcontractors are headquartered in Vidalia, La.

The main operation now under-

SITE of low-sill control structure at river's edge is enclosed by earth cofferdam extending from main levee. A channel will be excavated to Red River, seven miles to the right.

way is simultaneous excavating and dewatering of the foundation. The 90-acre job site is enclosed by an earth cofferdam running off the main river levee. Around the rim of the 40-acre excavation, Independent Wellpoint Corp. has built a dike to prevent unnecessary rain water from eroding the slopes. This water is handled by five 4-in. pumps and one 6-in. pump.

Within the excavation, dewatering equipment is added as the hole deepens. The first step was to install a 5,000-ft ring of first stage wellpoints. Actually, the circumference of the excavated area is 8,500 ft. But by dewatering wing walls separately at a later date, the first stage perimeter was reduced. Nearly 600 points were placed 8 ft apart at elevation plus 20. Three 10-in. pumps handle the system.

CENTER LINE of seven permanent Fairbank-Morse deep-well pumps is set up about 30 ft above subgrade. Pumps are powered by butane-burning Allis-Chalmers engines.

OUTER LINE of deep-well pumps dewaters area as Northwest 3½-yd dragline loads 13-yd Euclid bottom-dump wagons. Working two 10-hr shifts, contractor moves 12,000 yd a day.

Deep Wells

At the same time, Independent drilled and installed three lines of deep wells. Two outer lines have ten temporary 8-in. wells and the center line has seven 8-in. pressure-relief wells. They are about 120-ft deep and have 30-ft long screened tips. Permanent wells have wood-stave screens, while temporary screens are made of galvanized mesh.

Each of the two outer lines of wells is connected to three Griffin 12-in. pumps. The permanent center line consists of seven Fairbanks-Morse 8-in. deep-well turbine pumps powered individually by Allis-Chalmers butane-burning engines.

As excavation progresses, two additional stages of 27-ft-deep wellpoints will be installed. Each will require about 600 points. The second stage will go in on 7-ft centers at elevation plus 5, and the third stage on 6-ft centers at elevation minus 10.

At the same time, Independent will construct ditch and dike combinations on the 4:1 slopes to catch and store rain water. These ditches can store about four million gallons of water, which is removed by fifteen Griffin 10-in. pumps.

Independent estimates that 25,000 gpm of rain water can be removed from the job site—4,500 gpm between the perimeter dike and cofferdam, 4,500 gpm from the three stages of wellpoints, and 17,500 gpm from the 27 wells.

All water is carried out of the hole through two 30-in. discharge lines. Wellpoint and deep well lines run to 30-in. manifolds which discharge through two lines. A 1,750-ft line runs to the Mississippi and a 1,000-ft line goes out through the downstream cofferdam and empties in the swamps.

Excavating the deep hole is a one year job. Joe E. Freund Inc. is moving 3,000,000 yd of silty sand and clay with draglines and bottom-dump wagons. With four Northwest 3½-yd draglines and a fleet of twenty-two 13-yd Euclids, Freund moves 12,000 yd a day. He works two 10-hr shifts a day—seven days a week.

Representing the New Orleans District of the Corps of Engineers, U. S. Army is Adolph Hedegaard, Jr.; resident engineer. E. J. Alexander is president, and A. W. Macomber and W. R. Lawrence are superintendents for Independent Wellpoint Corp.

TOOTHED V-BLADE is mounted on dozer arms of rugged Allis-Chalmers HD-20 tractor.

TREE falls after 17-ft-long V-blade makes two or three passes flush with ground.

Four Tractors Clear Acre Per Hour

FINAL PASS topples huge tree. Blade's deep, flush cut prevents uprooting of stump.

JOB-MADE V-type saw blades mounted on the dozer arms of Allis-Chalmers tractors are leveling a dense forest in record time. Operated by R. Costello of Oak Grove, La., two new HD-21's and two HD-20's are clearing an acre per hour of jungle-like growth in rugged Mississippi River delta country.

Costello is working at least 10 hr a day, 6 days a week to clear 2,475 acres of right-of-way for the Old River control channel. Contract time is only 240 calendar days. He's taking full advantage of good weather now because heavy rains make the flat delta virtually impenetrable.

Costello has been in the land clearing business much of his life, and knows all the tricks. "You have to slide a blade at an angle to make a quick, clean cut," says Costello. His contract calls for cutting all vegetation flush with the ground, and spraying a killing solution on all stumps that are more than 3 in. in dia.

To make the flush cut, Costello has developed two types of V-blades. Both have toothed edges about 17 ft long. But one type has flat rounded teeth for shearing trees up to 18 in. in dia, and the other has cross-cut teeth that actually saw, flush with the ground, trees more than 18 in. in dia. Two tractors mount shear blades and one mounts the saw blade. A fourth piles material with a conventional dozer blade.

Equipped with torque-converters, the big tractors make only a few passes against a trunk before the tree crashes to the ground. Generally, one additional pass levels the in-place stump with the ground.

After five days, piles of cut trees are burned. According to Costello, the time for burning must be determined carefully. "If you can crunch the leaves in your hand, she's ready to burn," he says. And it doesn't pay to delay. After ten days, trees turn sour and develop tremendous resistance to fire. Costello assigns a Caterpillar D4 tractor to prod the fire.

SLIPFORM PAVER fed by Koehring mixer travels 3½ fpm on 22-ft crawlers and lays 24-ft wide pavement. Hydraulically operated bar strikes off concrete that builds up in front. Paver vibrates, screeds, and then smooths concrete with reciprocating rubber belt.

WORKER inserts load-transfer bar in front of advancing tubular vibrators on paver.

Look for More Slipform Pavers

SLIPFORM PAVING looks like the coming thing in highway construction. New machines now available and modifications of older models are steadily increasing the speed and efficiency with which the slipform paver can lay down a highway slab.

On a Colorado highway job south of Denver, an improved Quad-City paver laid an average of more than 1,800 ft of 24-ft pavement per 9-hr day. Operated by Bushman Construction Co. of Kansas City, Mo., the rig paved nearly 12 mi of two-lane roadway 8 in. thick.

According to the contractor, the slipform paver is a little difficult on soft ground, but its disadvantages are outweighed by labor and equipment savings. Engineers of the Colorado Highway Dept. are satisfied both with production and results.

Powered electrically from a generating set mounted on the main frame, the rig travels at the rate of 3½ fpm. Crawler tracks 10 in.

wide and 22 ft long ride on carefully prepared grade to produce the desired smoothness. Behind the unit, 57-ft-long slipforms are held rigidly by three truss-type cross frames spaced 15 ft apart.

On the Colorado job, concrete was mixed in a dual-drum mixer and dumped in front of the slipform paver. The rig's latest modification, a hydraulically operated bar extending the full width of the machine, rides back and forth on the forward frame and strikes off the mix about 9 in. above grade. It eliminates slipping of crawlers, which occurred on earlier models when too much concrete built up in front.

Behind the strike-off bar are two tubular vibrators, followed by a tamping bar, a screed, and a 24-in. transverse reciprocating belt.

Generally, four men finish the slab with hand tools. Working long aluminum-handle floats, they smooth the surface as the slipform moves ahead. A burlap cloth hanging from the last cross bridge gives a final finish. There is no sloughing of the sides in back of the trailing edge of the form.

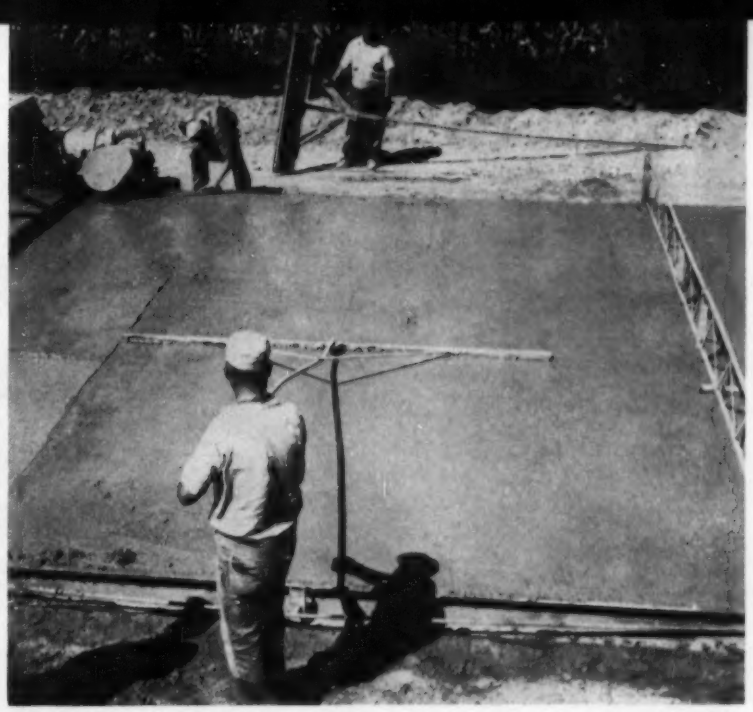
Bushman Construction Company sprayed Hunt's curing compound on the pavement surface behind the paver and cut control joints 48 hr later. Sawed every 25 ft by a Clipper Consawmatic, joints were filled with a Carey hot plastic compound.

Two Johnson aggregate bins and one Butler cement silo handled batching. Aggregate bins were charged by Manitowoc and American clamshells.

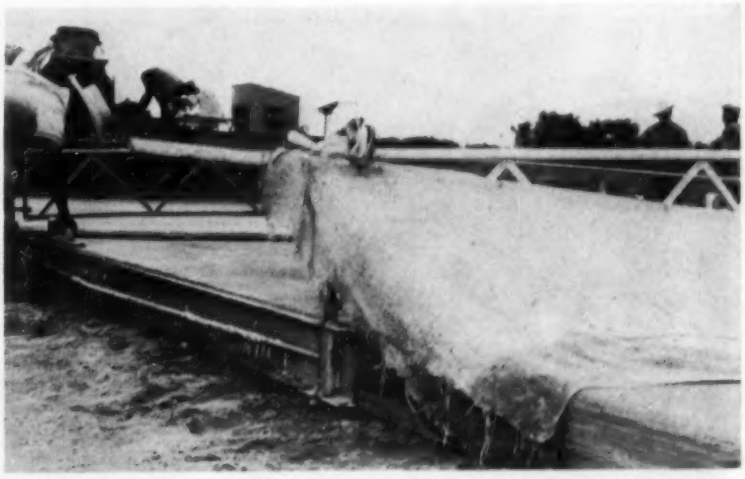
A fleet of nine batch trucks supplied a Koehring 34E dual-drum paver working outside the pavement limits. Concrete with a 2-in. slump was dumped from a 34-ft boom in front of the slipform unit.

The slab was unreinforced. Load transfer bars 24 in. long were placed along the centerline of the 24-ft slab. Working just ahead of the tubular vibrators, a man inserted the ¼-in. bars 4 in. deep and 18 in. apart.

The paving spread required a crew of 18. Besides the foreman, there was one man dumping trucks, one mixer operator, two men spreading concrete dumps, one man placing load-transfer bars, one slipform paver operator, four finishers, two helpers, two men spraying curing agent, one saw operator, and two water-truck drivers.



FINISHERS with lutes and straightedges level pavement behind paver. Crossbridges support 57-ft long slipforms on each side of slab. Hunt's cure is sprayed on top.



BURLAP DRAG hanging from last crossbridge gives pavement final finish. Note lack of sloughing of sides behind trailing end of slipform. Unreinforced pavement is 8 in. thick.

JOINTS are sawed every 25 ft with Clipper Consawmatic. Generally, slab is ready for sawing two days after pour. Joints are filled with Carey hot plastic compound.

SCRAPERS AND DOZERS build up mound of gravel within circle of completed columns. Layer of fine stone stabilized surface. Sheepsfoot and rubber-tired rollers did compacting.

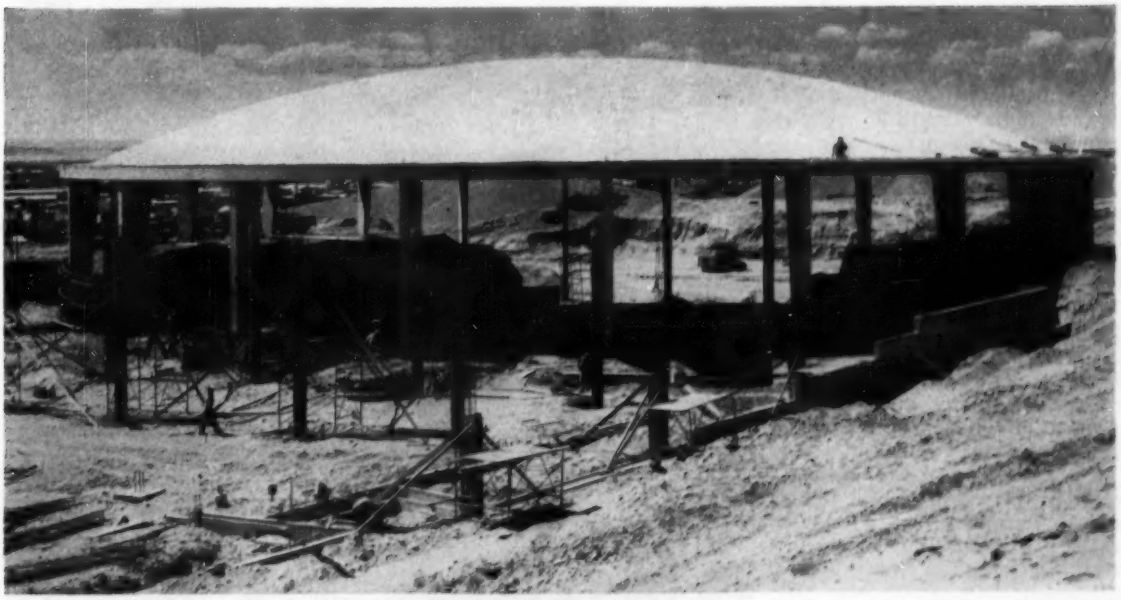
PLYWOOD PANELS ¾ in. thick are placed over lower 30 ft of mound to provide smooth surface on exposed area of concrete dome's underside. Rest of mound is uncovered.

Earth-Mound Form Slashes Cost Of Concrete Dome

A SIMPLE MOUND of earth served as the form for a thin-shell dome in Albuquerque, N.M., and saved the contractor at least $50,000. It eliminated the conventional forest of formwork, speeded concrete placing, and simplified circumferential prestressing.

The job was unique. Albuquerque contractor Lembke, Clough & King, Inc., took advantage of a hilly job site, shaped native material into a mound, poured concrete

PAIR of Link-Belt cranes place concrete over mound in four concentric-circle pours. On top pour, buckets are emptied into buggy-loading hoppers. Placing required 1½ weeks.



COMPLETED DOME stands high in air atop ring of columns after 100,000 yd of earth is excavated around and underneath. Method eliminated complex formwork and saved $50,000.

on top, and then excavated underneath. The resulting thin-shell dome had a rough underside, but, this was no problem because most of it was covered later with acoustical tile.

Basically, the structure is a circular dome 218 ft in dia supported on 22 circumferential columns up to 42 ft high. The 23-ft high shell is 5 in. thick at the crown, and thickens to 9 in. at the periphery where it is enclosed by a prestressed ring girder 3 ft wide and 2 ft thick. The $1 million structure will serve as an auditorium for the City of Albuquerque.

At the beginning of the job, natural ground was about at the level of the dome's spring line. This meant that at least 100,000 yd of material normaliy would have been excavated if the structure was to be built by conventional methods.

But Lembke, Clough, & King took a gamble. Instead of excavating the entire area, they cut only a doughnut shaped trench in which they built the dome's footings and columns. The trench was backfilled around the columns, and a mount of native sand and gravel was built up within the ring of column tops.

The material was acquired right from the site. Dozers and scrapers rough graded the mound, and sheepsfoot and rubber-tired rollers

EARTH—MOUND FORM

continued

did the compacting. By mixing in about 18 in. of disintegrated granite stone on top, the contractor achieved excellent stabilization and compaction of the surface.

When mound grading was completed, crews placed ¾-in. plywood, panels around the lower 30 ft because this part of the dome's underside would be exposed later. The rest of the earth mound was uncovered. Reinforcing steel was placed over the mound, and a circumferential form was built to contain the ring girder.

Concrete Placing

The 1,000-yd concrete dome was made in four concentric-circle pours, starting at the bottom. It required 1½ weeks.

For the first pour, ready-mix trucks simply drove around a surrounding access road and chuted concrete directly in place. Two Link-Belt Speeder cranes handled the next two lifts. They started back to back placing concrete with buckets, and continued around the mound until they met.

On the top lift, the cranes dumped into hoppers which fed a fleet of buggies that discharged from wood runways. Circular bulkheads were keyed to bond adjacent lifts.

After the dome was poured, a Crom machine prestressed the ring girder around the base of the dome. Supplied by Colorado Fuel & Iron Co., high-strength wire was wrapped around the girder at a tension of about 145,000 psi.

Wire-wrapping machinery was mounted on a trailer and pulled around the dome by a crawler tractor. When 655 turns were wrapped, the wire was covered with grout.

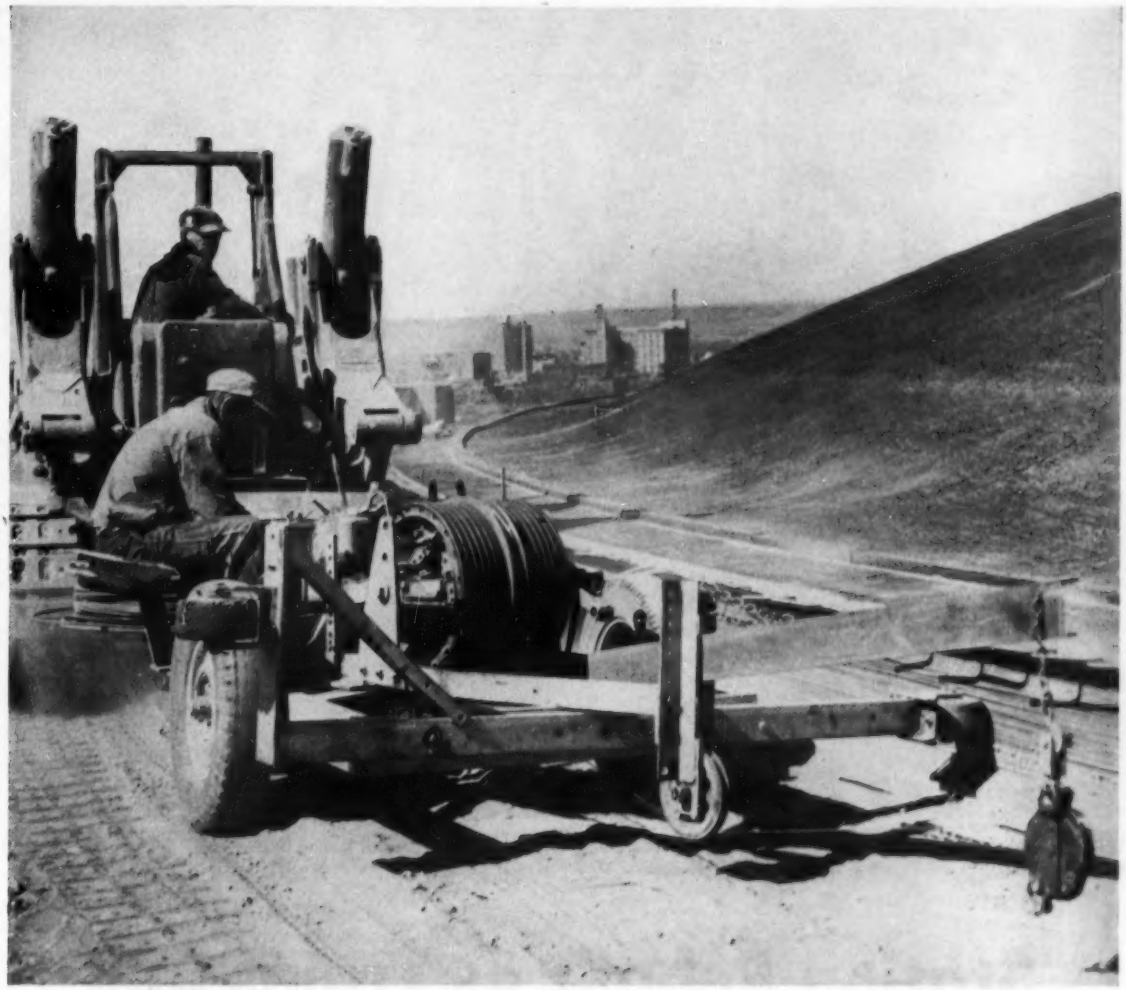
The contractor began excavating as soon as the wire wrapping was completed. Working on two sides of the dome, shovels and trucks quickly ate up dirt around and under the structure. In restricted areas, dozers cut benches and pushed the earth to shovels. When the earth was removed, the dome stood high in the air on its ring of columns.

Richard Clough was project manager and Robert McElveney was superintendent for Lembke, Clough & King, Inc. Architects were Ferguson, Stephenson & Associates of Albuquerque.

SAND AND GRAVEL material is fine graded by workmen near base of mound. Bent reinforcing bars protrude from top of buried column to bond with concrete in dome.

REINFORCING BARS are placed inside form for heavy ring girder running around base of dome. Beam will counteract prestressing load when wires are wrapped in outside groove.

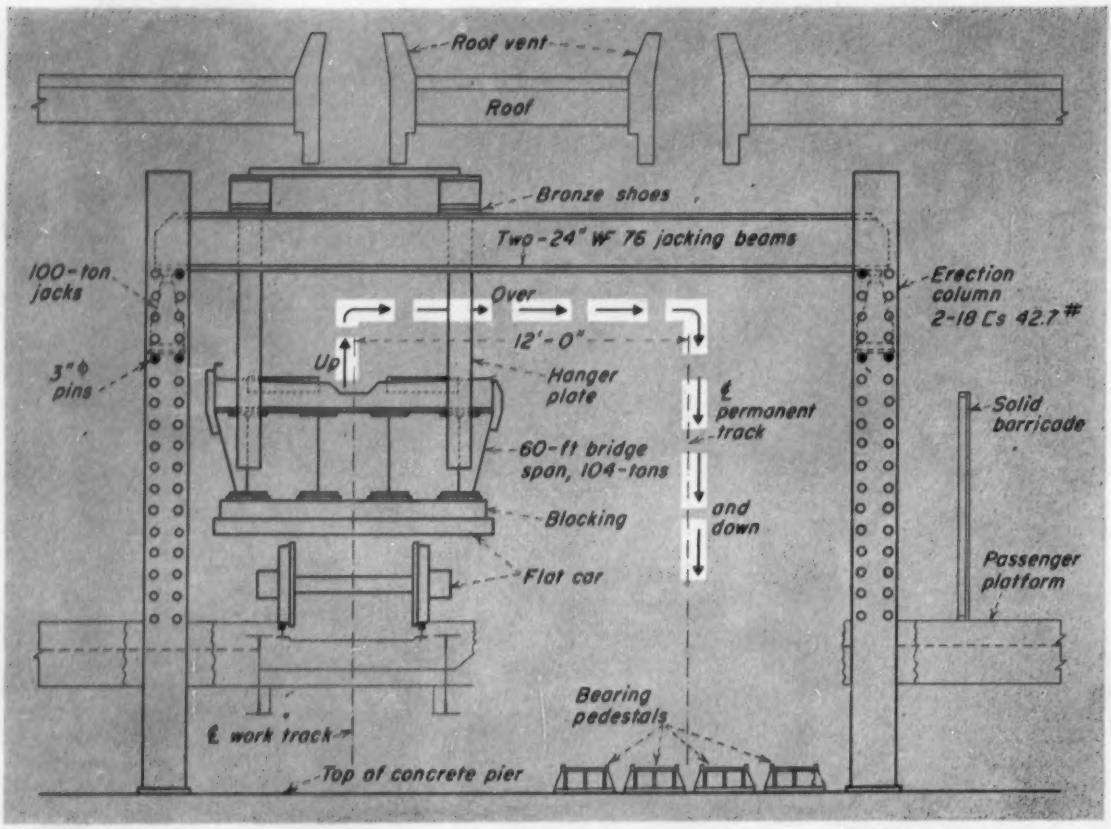
boon to contractor—dome's earth form saves $50,000



RING GIRDER is post-stressed by 655 turns of wire applied at stress of 145,000 psi. Pulled by tractor, device tensions wire on hydraulically operated drum, instead of die.

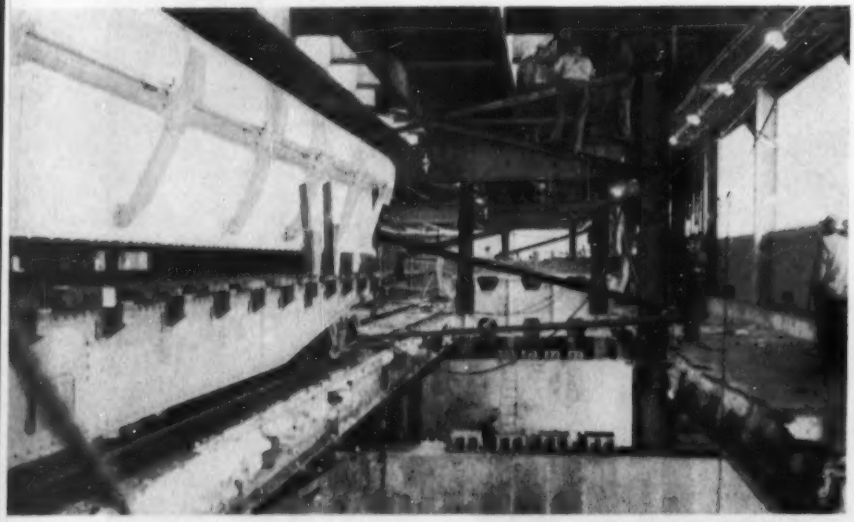
FINISHERS tamp and smooth concrete at crown. Thin-shell dome varies in thickness from 5 in. at crown to 9 in. at base. Concrete is poured directly on compacted earth.

SHOVELS and dozers excavate under dome. Natural ground level was about at level of dome's spring line. Heading and bench methods pay off under center portion.



UNIQUE jacking system makes setting huge 104-ton pre-assembled bridge spans almost child's play. Jacking equipment consists of a team of jacking frames, jacking beams, hanger-plate assemblies, and several pairs of 100-ton pneumatic jacks.

Station Rebuilt as Trains Roll



FLAT CAR arrives on job and workmen quickly bolt hanger-plate assemblies to the ends of the span. Span next will be raised a few inches and the flat car rolled out of the way.

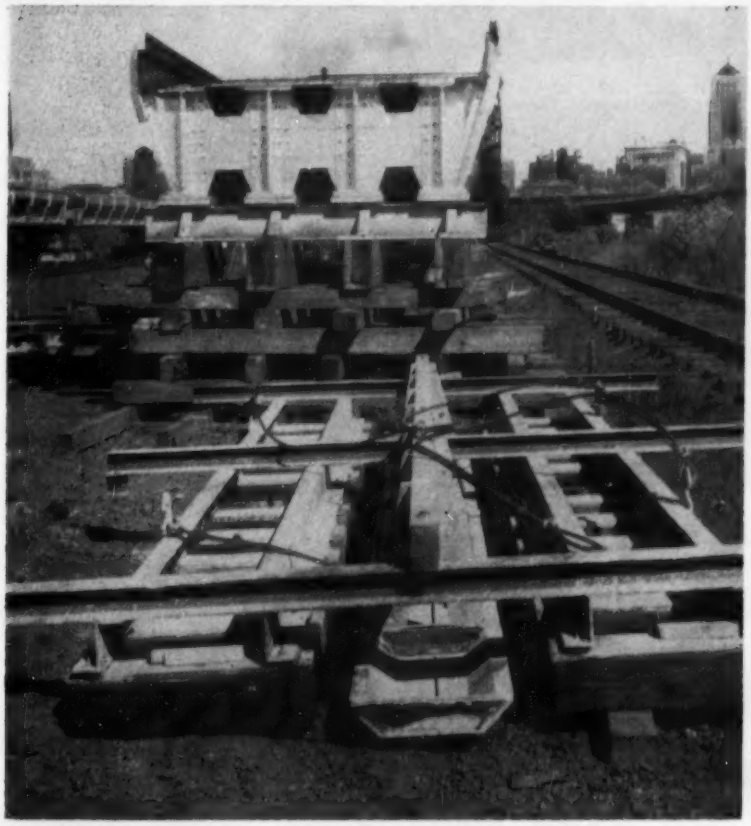
PRE-ASSEMBLED bridge spans, and an unusual traveling jack method for erecting them, made possible a $1.3 million reconstruction of Chicago's La Salle Street station with almost no stoppage in railroad traffic.

The city's new $105 million Congress Street Expressway will run under the elevated 11-track station, and the job called for careful planning of construction methods and close cooperation by city, railroad, and contractor.

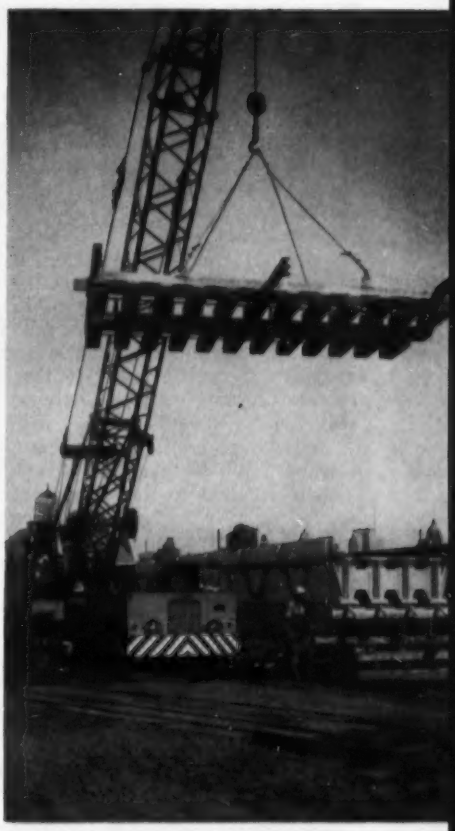
The station—owned jointly by the New York Central and Rock Island Railroads—stood smack in the path of the expressway. The existing track-supporting structure in the path of the highway consisted of girders supported on steel columns. Columns were spaced 15 and 30 ft on centers.

But each of the two roadways of

Pre-assembled bridge spans are readied at yard. . . .



PRE-STRESSED BRIDGE SPANS sit on cribbing where they will be concreted and fitted with track ties and forms for drainage trough, mounted under carrying template.



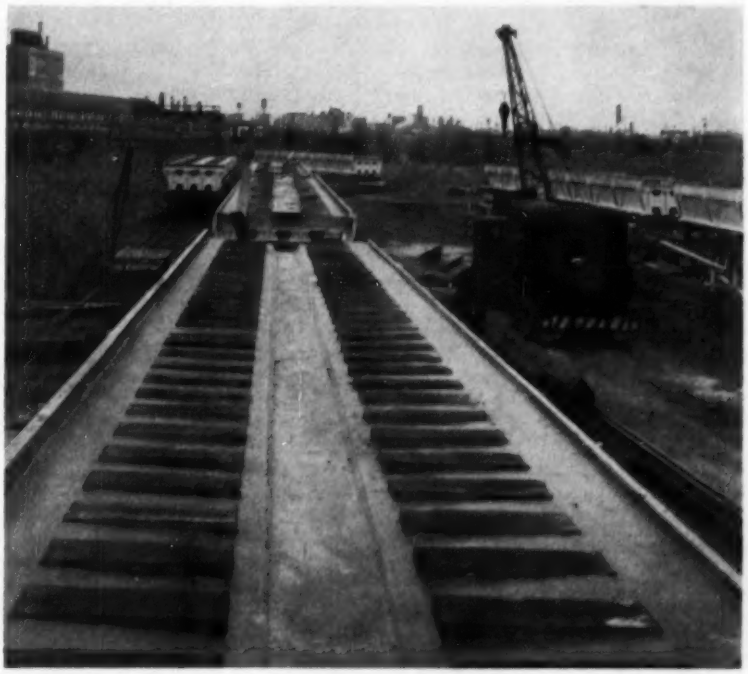
TEMPLATE carrying pre-set ties is lowered by crane into place inside the bridge span.

the superhighway had to have some 60-ft clearance. This meant removing nearly all of the existing supporting structure along with its tracks and ties, then placing longer spans to bridge the two, four-lane pavements.

That wouldn't have been too difficult except that the railroads serve more than 1,000,000 passengers yearly and handle a heavy traffic in mail and express. The station is Chicago's main terminal for both railroads so trains could not be rerouted or accommodated elsewhere. As a result James McHugh Construction Co. of Chicago could work only two track at a time.

McHugh first built three concrete piers parallel to the expressway centerline. Each was 216 ft long, 12 ft high and up to 3 ft thick. One pier was built on each side of the expressway and the third was erected on the road's median strip. Old tracks, girders, and supporting columns were left to be removed later.

A series of 60-ft-long bridge spans, each designed to carry one track, was fabricated by American



COMPLETED SPAN, mounted on cribbing, awaits removal to job. Spans will be placed on railroad flat cars and transported over specially built spur track to job site.

REBUILDING STATION...

continued

Bridge Division of U. S. Steel at its plant in Gary, Ind. American Bridge shipped these to a railroad yard near the job site where McHugh poured a concrete deck on the spans and embedded necessary track ties.

Once decks were cast, the pre-assembled spans were lifted by crane onto flat cars which ran on specially-built spur tracks to the station. Meanwhile, workmen had removed existing ties, tracks, and girders for a single 120-ft track section crossing over the expressway.

Removing one track section opened a 120-ft-space, 12 ft wide. The track next to this open space served as a "work" track and enabled the contractor to roll a railroad flat car carrying one of the pre-assembled bridge spans alongside the opening.

Steel erection subcontractor F. K. Ketler Co. of Chicago then took over. Ketler's role was to transfer the 104-ton spans from the flat cars and set them into position over the concrete piers. Ketler made use of an interesting—company designed—jacking method to do this.

The method hinged on two jacking frames set on the concrete piers and existing structure. The frames bridged a two-track section that included work track and open space. Each frame consisted of two jacking columns held rigidly together 28 ft apart by steel braces. Two jacking beams connected each pair of columns while two hanger-plate assemblies were held suspended by bronze shoes from each pair of jacking beams.

Jacking columns were two channel irons bolted together so that one side remained open. Two sides of the column were perforated with 3-in.-dia. holes through which pairs of 3-in. steel pins could pass to support a jack and make the columns adjustable.

The frames were bolted securely to the concrete piers and station structure and guyed at their tops. Two pieces of 6x8's then were crossed over the paired steel pins in each post. A 100-ton pneumatic jack was placed over each of the pairs of 6x8's. Jacking beams, which transversely spanned the two-track sections, were put on the jacks.

The lower ends of the hanger-plate assemblies were bolted to the ends of the bridge unit. Workmen then set the pneumatic jacks in motion. The four jacks simultaneously raised the pre-assembled unit a few inches, and workmen rolled the flat car out of the way.

Then, using the jacking columns as reaction, two 15-ton track jacks set on top of each jacking beam pushed the hanger-plate assemblies sideways along the top of the jacking beam until the bridge unit came over its final position.

The 100-ton jacks then were reversed, and the jacking beams were lowered in short steps for about 10 ft to seat the unit. To accomplish the steps beyond the rise of the jacks, workmen pinned the jacking beams to the jacking columns, then reset the jacks and their supporting pins. This completed a one-track bridging of two piers. Moving the jacking frames ahead 60 ft and repeating the jacking process completed the full 120-ft single-track crossing.

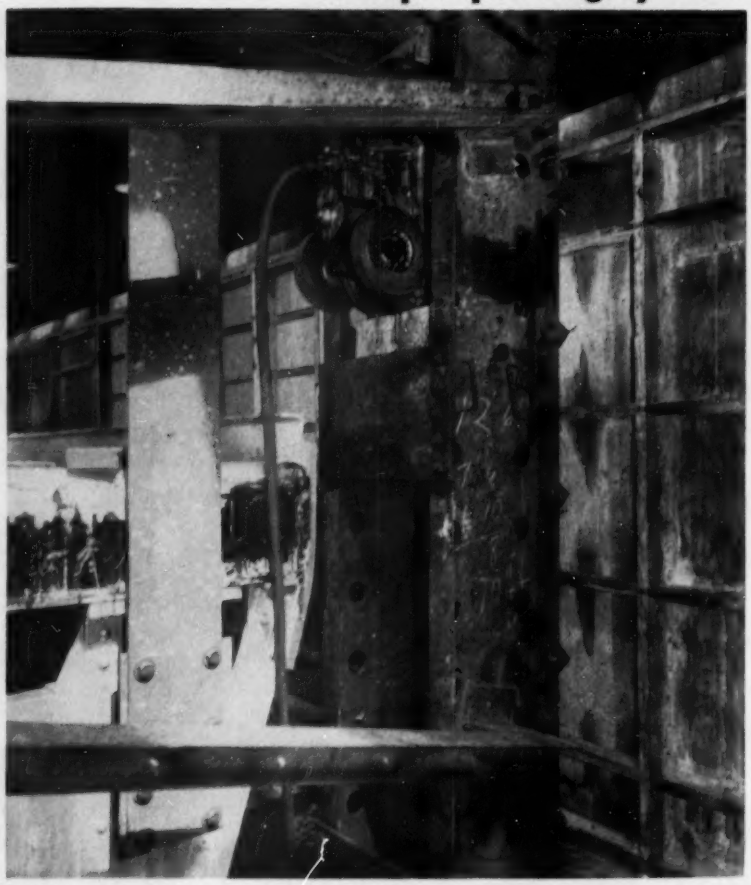
Rails then were spiked onto the new span and connected to the temporary spur track. The new span then became the work track. The second single-track crossing which previously served as the work track next was removed.

Repeating the jacking process here and for the remaining nine tracks completed the operation. When all tracks were in place, precast platform sections — which weighed only 60 tons — were brought out on flat cars and placed by steam-operated railroad crane. A final grouting completed the job.

Erection equipment was designed by the steel erection company's president, F. K. Ketler, with E. S. Joehnke, the firm's chief engineer, and Dan Johnson, general superintendent. Plumb, Tuckett & Pikarsky, Gary, served as consulting engineers.

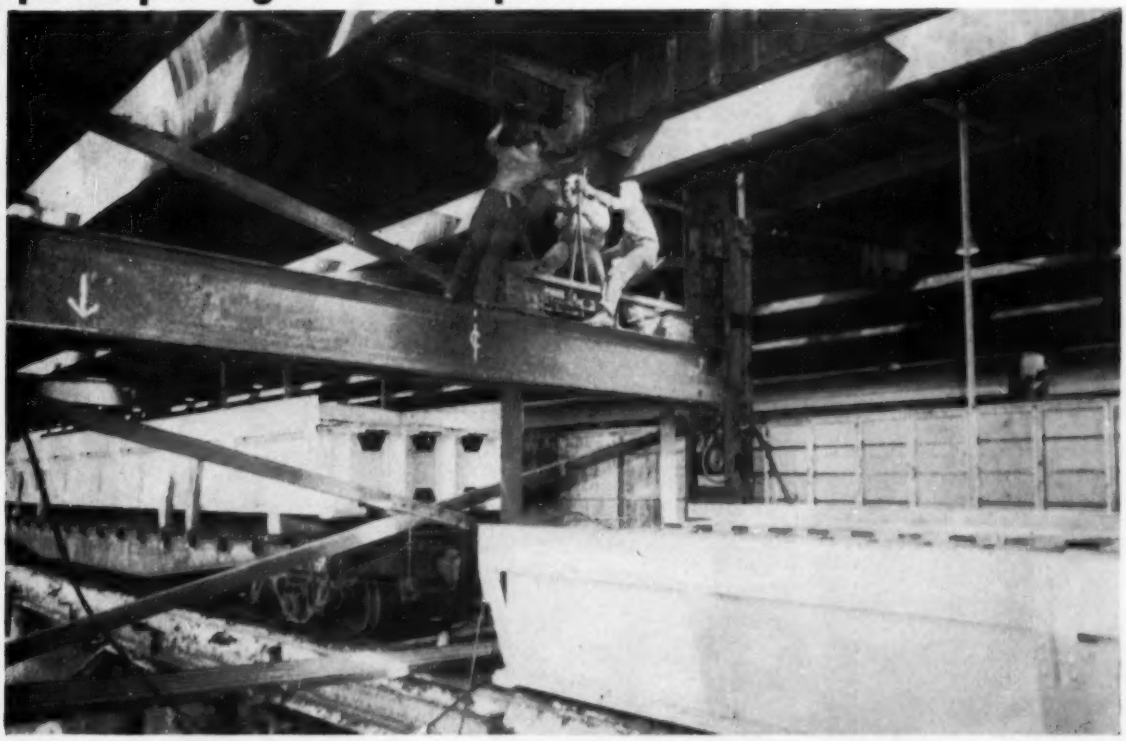
Plans for the project were prepared by the Bureau of Engineering, City of Chicago, Dick Van Corp, chief engineer. Construction was under the general supervision of J. Walter Grimm, assistant chief engineer. A. J. Kinder was the city's resident engineer.

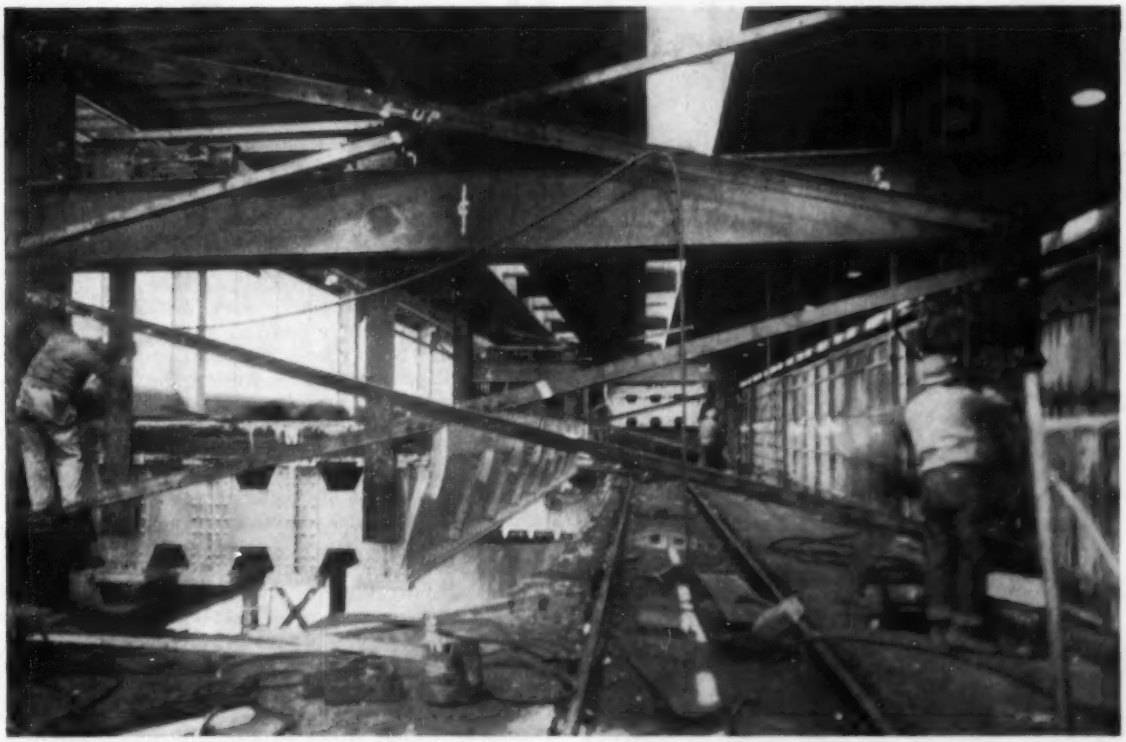
Unique jacking system



PNEUMATIC JACK, a 100-ton Ingersoll-Rand, sits on two pieces of timber which are supported on 3-in. dia steel pins in posts. Pins permit raising and lowering jacks beyond rise.

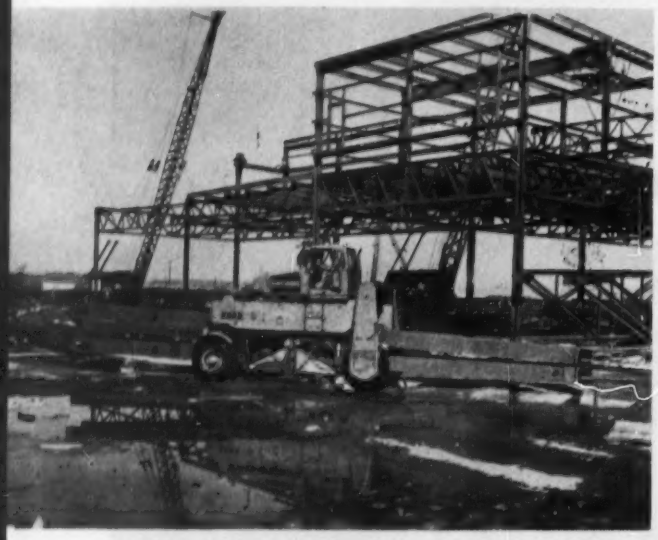
speeds placing of 104-ton spans....





PLACING pre-cast bridge spans is done in three stages: 1) After car arrives on job, span is lifted free of flat car by jacks set in posts; 2) Workmen slide spans over jacking beams with 15-ton track jacks using posts as reaction; 3) Jacks in posts are reversed and the span is lowered in short steps into position on top of the concrete supporting piers.

FOUR TRUSSES each weighing 4 tons are carried on the sides of Ross Carrier by special frames supported on lifting-hook extensions. Straddle trucks eliminate two cranes and fleet of trucks on job.



CARRIER operated by American Bridge Division of U.S. Steel Corp. hauls two 55-ft steel columns weighing 7½ tons apiece.

GIRDERS weighing 7½ tons are carried in conventional load cavity of straddle truck. They are 24 in. deep and 40 ft long.

Straddle Trucks Cut Steel Handling Costs

THREE VERSATILE straddle trucks working at the new Fisher Body plant in Indiana are eliminating a lot of costly steel rehandling. Operated by the American Bridge Division of U.S. Steel Corp., the Ross Carriers maintain a smooth, steady flow of structural shapes from rail siding to site.

It is a well organized job. Girders, beams, columns, and trusses are brought in on a rail siding several miles from the 33-acre building site. Instead of loading units slowly on trucks, the contractor immediately places them on bolsters, freeing the rail cars and minimizing demurrage changes.

From the rail siding, the structural shapes are picked up by the straddle trucks and hauled directly to the site or to a huge yard. This method eliminates the need for a fleet of trucks and for a crane in the yard to load the trucks and a crane at the site to unload them.

The Carriers move swiftly. They pick up a load, deliver it, and return for another load in only 7 min. The round-trip cycle is ¾ mi. The three Carriers move an average of 720 tons of steel in an 8-hr day. Members weigh up to 20 tons and range in size up to 80 ft long.

Special frames enable a Carrier to lift four 80-ft trusses at a time. Other structural members are carried in the machine's conventional load cavity.

In addition to speed, the Carriers are proving their flexibility by handling barrels of oil and fuel.

On housing development jobs...

the No. 955 Traxcavator* pays its way

From digging basements to building streets and grading lots, the new CAT* No. 955 Traxcavator is a bearcat for work, a money-maker for contractors.

The machine shown here is owned by R. & M. Construction Co., St. Louis, Mo. Working on an 83-home project in the Crestwood area of St. Louis, the No. 955 is in constant use, forming subgrade for streets, digging sidewalks, backfilling foundations, spreading and grading topsoil. Mr. Howard Skinker, Master Mechanic and Grade Foreman, says: "This new No. 955 is a big improvement in tractor shovels. The increased visibility and new bucket mechanism make it a much more valuable machine."

The No. 955 is one of three new Traxcavators in the Caterpillar line. Its bucket capacity is 1½ cu. yd. The No. 933 has a 1-cu.-yd. bucket; the No. 977, 2¼-cu.-yd. All three machines have balanced weight, traction and power to dig in hard material. They lift loads surely and quickly and are easy to maneuver. One-hand bucket operation and a comfortable seat set high for visibility give the operator a break. There's a long-lived, trouble-free oil clutch of proved superiority. The 40-degree bucket tilt back at ground level assures full loads at every pass.

If you're looking for the right unit to meet your excavating and loading needs, ask your Caterpillar Dealer for a demonstration right on your job. You can trust his trained service men and factory parts to keep your Cat equipment in top working order.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

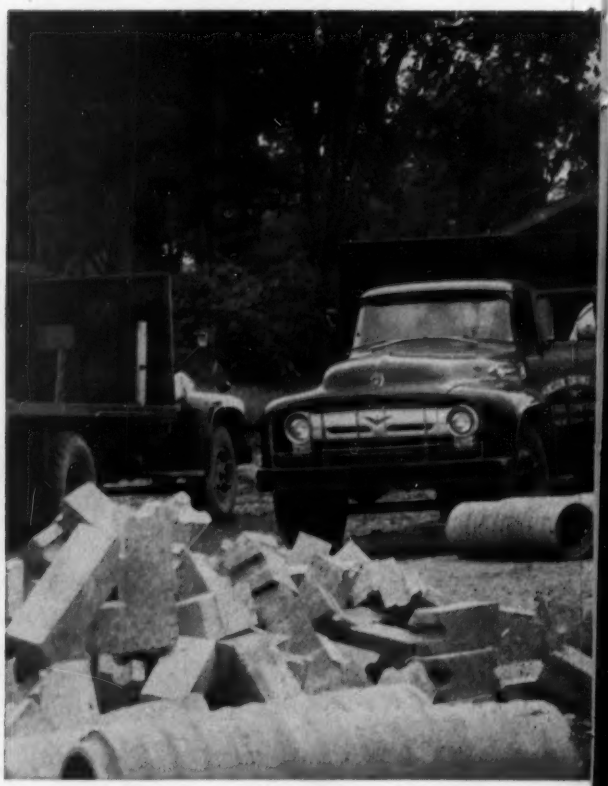
CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks

MODERN HEAVY-DUTY EXCAVATING EQUIPMENT

LOOKING FOR THE LOWEST-COST TRUCK?

Take a tip from the men who buy trucks every year!



Big fleets buy more Fords

"Our 27 Fords average 5½ miles to the gallon," say cement haulers of Material Transportation Company, Harlington, Texas. "Oil economy is good, too. Our F-800 and F-900 BIG JOBS average 125,000 miles before we drop the pan. Fords are the most economical and satisfactory trucks we've ever used."

The big fleets keep complete cost records. They know which trucks cost less to buy and run. And official R. L. Polk registration figures PROVE FORD IS THE FAVORITE!

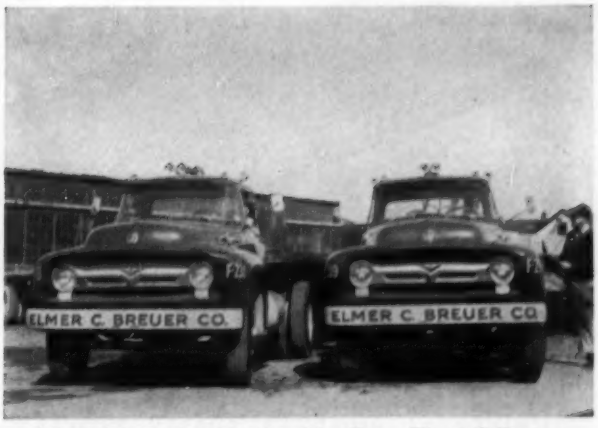
Take a look at these pages. These leading companies are just 4 out of thousands that are finding Ford trucks cost less to buy, less to run—*and* are "tops" for all-round economy.

The "men who buy trucks every year" must take everything into consideration . . . Short Stroke engine design for low oil and gas consumption . . . Ford's stronger chassis for longer life (insurance actuaries prove Ford Trucks last longer) . . . and Ford's higher resale value. So—from Pickups to 65,000-lb. GCW BIG JOBS, the big fleets are going Ford. You'll agree *Ford Trucks cost less*—when you see your Ford Dealer.

"Our 300 Fords cost less to run," says Johnson, Drake and Piper Inc. of N. Y. City, world-wide contractor and owner of F-800 BIG JOBS. "We've tried all makes but our records show that, when all factors are considered, *Ford Trucks cost less.* Low running costs. Low purchase price. High trade-in value."

than any other make!

"Our 102 Fords last longer," says David L. Brown, Tennessee contractor and owner of Ford T-800 BIG JOBS. "In our kind of work, we need a truck that can take a real beating and keep on going. We have a Ford that's been running for 5½ years without a motor job—and it's still rarin' to go!"



"Our 30 Fords are easiest handling," says Elmer C. Breuer, Cleveland steel hauler. "Maneuvering our Ford F-900's in tight spots is timesaving and easy. And with that Power Steering our drivers finish fresh after a tough day's work. We're staying with Ford because they give us fast, dependable service."

FORD TRUCKS COST LESS—LAST LONGER

Using latest license registration data on 10,502,351 trucks, life insurance experts prove Ford Trucks last Longer.

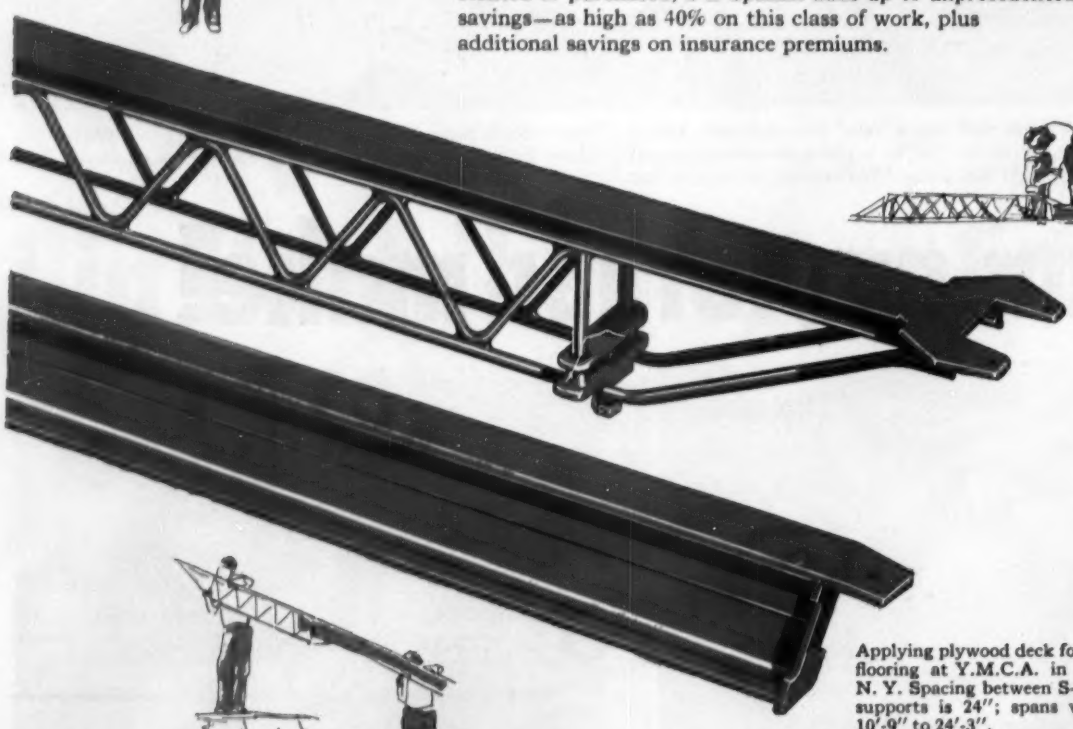
like no other building device **Spanall®**
HORIZONTAL SHORING

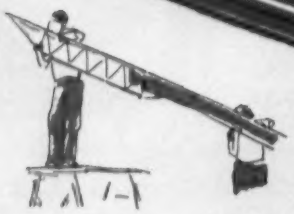
helps contractors save time, labor and money

S-L Spanall assembles fast and conveniently to desired span lengths — up to 28 feet 2 inches without need for intermediate supports

—frees work areas on floor below
—adjusts quickly to desired span lengths
—supports 44 times its own weight—with safety factor of 2.17
—*and* **Spanall** *features built-in camber.*

Rented or purchased, S-L Spanall adds up to unprecedented savings—as high as 40% on this class of work, plus additional savings on insurance premiums.





Applying plywood deck for concrete flooring at Y.M.C.A. in Syracuse, N. Y. Spacing between S-L Spanall supports is 24″; spans vary from 10′-9″ to 24′-3″.

UNIVERSAL BUILDERS SUPPLY COMPANY, INC.
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AWARD OF HONOR is presented to Project Manager Clyde Newcomb (second from left) by National Safety Council's Wendell Blair. Also shown are Ed Pasha, Drake-Merritt general manager, and Bob Bayard, president of Johnson, Drake & Piper International Corp.

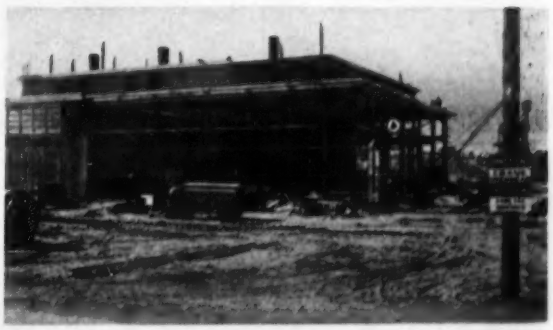
Labrador Job Wins Safety Honor

DESPITE THE RIGORS and difficulties of working in remote Labrador, the contractor building Goose Air Force Base there has set a phenomenal safety record. And for its fine performance, Drake-Merritt has won the National Safety Council's top award, the Award of Honor. What makes the job even more outstanding is the dismal accident record the job racked up the previous year (table).

Drake-Merritt (a joint venture of Johnson, Drake & Piper International Corp. and Merritt-Chapman & Scott Corp., both of New York) had no easy job, either on base construction or with safety. Winters brought more than 200 in. of snow, so during that season work was pushed on the interiors of the structures being built. Outdoor construction season was only 5 months long, at best. And then drifting sand quickly filled pipe trenches, buried road forms, and dried the concrete of the runway slabs as quickly as it was poured.

Self-Sufficient Job

Because access to the site is only by air, or by ship during the short summer, the contractor's setup had to be pretty self-sufficient. A four-machine concrete block plant, for example, was set up to turn out 2,000 units daily, and the project requires close to a million blocks. Huge warehouses were built to store the foreign bagged cement used (900,000 bags last year alone). A quarry was opened up, and two large multiple crushing and screening lines were installed to process the prodigious quantities of granite aggregate

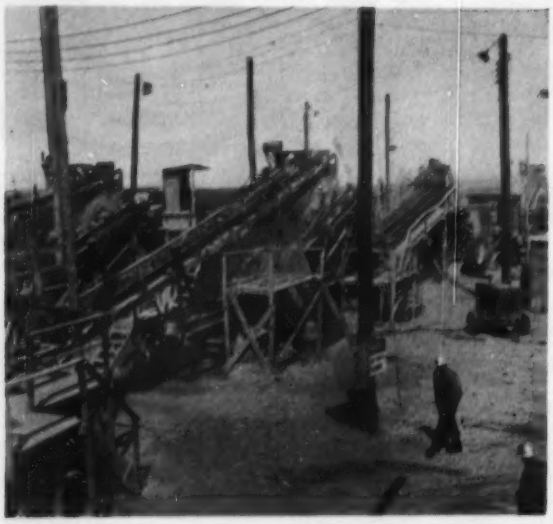


COMPLICATED STRUCTURES, such as this addition to base's central heating and power plant, called for strict safety measures.

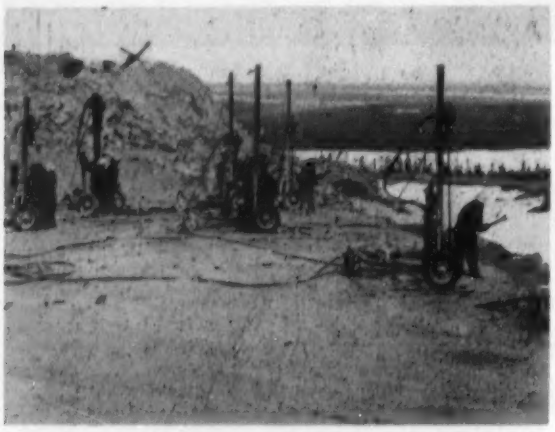
Safety Record

Year	'54	'55
Manhours	6,250,000	4,130,000
Lost time accidents	89	24
Days lost time	21,280	806
Fatalities	3	0
Permanent disabilities	many	none
Frequency rate	14.57	5.81
Severity rate	3,410	195

Construction industry average (Bureau of Labor Statistics): Frequency 32.9: Severity 3200.



AGGREGATES for structures, pavements, and road bases are processed in two parallel lines of crushing and screening units.



QUARRY, opened up in granite hill behind low-lying base (background), first had poor accident record but improved radically.

CONCRETE APRON OVERLAY is smoothed by longitudinal bull float finisher equipped with floodlight for round-the-clock operation.

called for throughout the life of the job. To reduce costs, Drake-Merritt arranged to bring in asphalt in bulk by ship and store it in heated tanks. In all, 15,000 tons was used.

Contractor ingenuity showed up in such diverse areas as a job-built mechanical cutter to allow bagged cement to be used in bulk, and a job-built 4½-yd dipper so an ordinary 1½-yd shovel could handle snow economically.

Equipment maintenance so far from ordinary sources of supply called for extra-large parts stocks. And these would have been even larger had not Drake-Merritt followed some inventory-cutting practices. Among them: stocking semi-finished bearings that were finished on the job, as needed, to the size required; and keeping a perpetual inventory system, so cross-referenced that a substitute part or brand could be found readily when the supply of the originally specified item had been depleted.

To reduce maintenance considerably in winter, the mechanics' work day started ½ hr earlier than the equipment operators'. This gave them a chance to start up each machine left outdoors and let its engine get warm before the rig went into operation. The equipment maintenance setup included one shop for heavy machines such as shovels and tractors, one shop for lighter equipment and all rubber-tired rigs, a motor rebuilding shop and a complete machine shop.

Labor was the biggest headache and also the focus of the safety program. Work force (on a 10-hr day, 6-day week) ran as high as 4,500 men. Only the contractor's supervisory force was brought from the U. S.; the rest were recruited from other parts of Canada. Many were comparatively new immigrants to Canada, and one official claims they spoke 27 different languages and dialects on the job.

Most of the workers were unskilled when they arrived, and had to be taught higher trades. While wages were low (90¢ for common labor, $1.50 for carpenters) efficiency was such that over-all labor costs were comparable to the U. S.

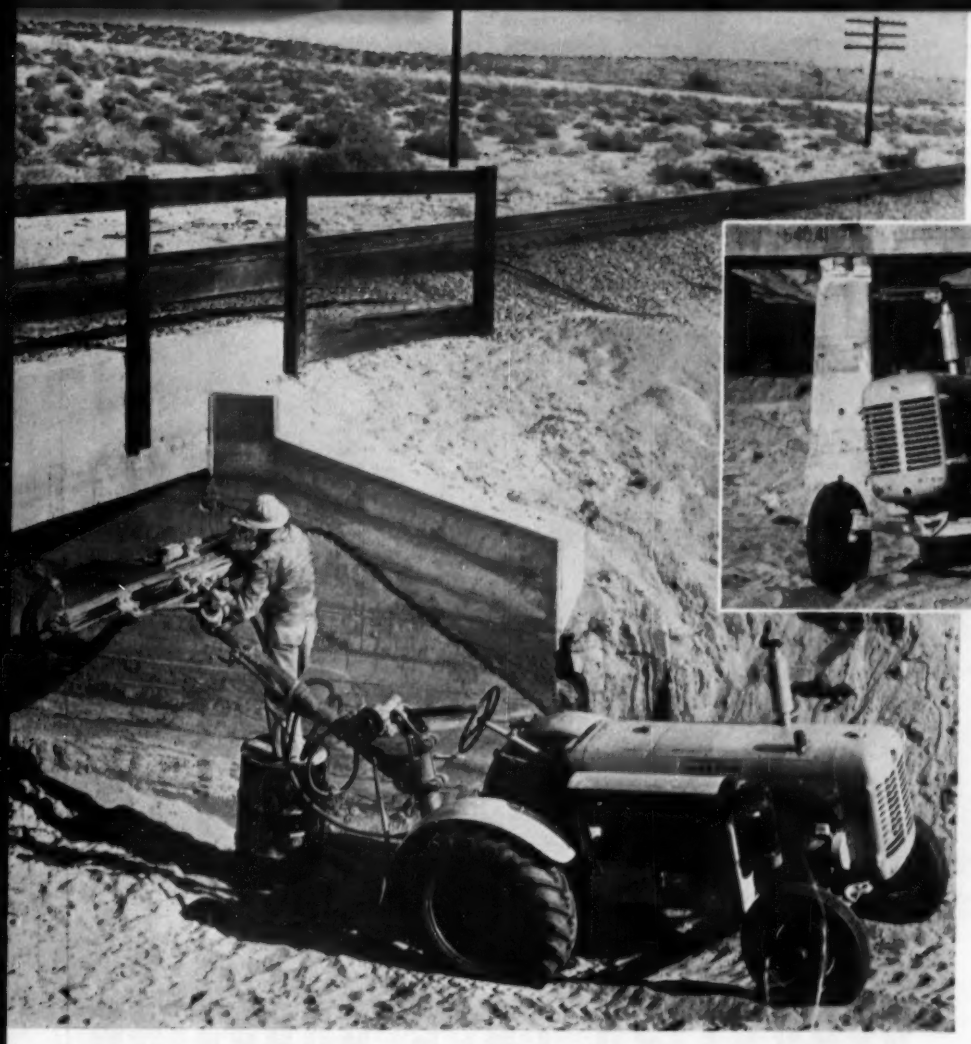
Safety was another matter. Most of the workmen had never heard about accident prevention before going to Goose Bay, and seemingly didn't want to. The job was operating with an accident frequency rate of nearly 22 disabling injuries per million man-hours and with a severity rate of 7½ days lost per 100 man days. Then a chief safety engineer was brought in and given two assistants, a real safety program was established, and—much more importantly—it was followed. Result: a terrifically improved record, and the Award of Honor.

Job Safety Practices

Drake-Merritt's new safety program extends through all ranks on the job. A safety contest is held monthly for all general superintendents, with a permanent annual award for the one with the best record. General safety meetings for the entire supervisory staff are held at frequent intervals.

The safety engineer is included in the weekly top-level planning and progress meeting so he can advise on possible hazards and prepare for new operations. Each week suggested talks are issued to foremen, based on the hazards to be expected in performing the upcoming work. Each foreman is required to conduct an informal 10-min safety meeting with his crew immediately following Monday lunch.

(Continued on page 79)



This self-propelled Le Roi Tractair with Mobildrill attachment is altering hundreds of railroad bridge structures in the Salton Sea desert area of the Southwest. The bridge structure changes will permit the installation of a new train control system along a 200 mile area of the Southern Pacific railroad.

The Tractair Mobildrill attachment can be positioned in a wide range of angles for all kinds of drilling. The air-fed Mobildrill makes drilling quick and easy for the operator. On this job, contractors take advantage of the Tractair's versatility and mobility to reach work sites out on the desert sands.

How Railroad Uses Tractor-Compressor to Lick 200-mile Job in Desert Sands

Drilling rig mounted on combination unit, speeds from one working location to another.

Le Roi Tractair mobility not hindered by the dry, loose sand.

On the job, Mobildrill swings easy, gets into tight corners, saving hours in weekly drilling time.

Shifting sands of the desert pile up some equipment problems on the new train-control system project now under way between Colton, California and Yuma, Arizona.

The T. M. Page Corp., subcontractor on the 200-mile project says, "We found an answer in the Le Roi Tractair. It's one machine able to crawl through this very loose, dry sand under its own power. It's versatile. Most of the other machines need a crawler tractor to get them in and out of the work sites."

The Tractair with its air-fed Le Roi-Cleveland Mobildrill attachment is drilling hundreds of concrete supports for alteration of bridge structures. The Mobildrill makes drilling easy for the operator, as it can be swung to a variety of angles for all kinds of drilling.

Because Tractair is a combination 125-cfm air compressor and a 42-hp wheel tractor in one self-contained unit, it can be equipped with a wide variety of attachments. These include a front-end loader or a backhoe, plus dozens of accessories and air tools for most any need.

Three other Le Roi compressors are used on the project. "Perfect" service for all four Le Roi machines is provided by the distributor, according to the contractors. All of the Le Roi units work 8 to 9 hours each day in the hot climate.

7-53

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

Heaping load on the bulldozer is easily handled by the Turbocharged D9. Notice all-around visibility from operator's seat—also easy access to controls.

D9 SETS PRODUCTION PACE CROSSING ON SECTION 33, MASSACHUSETTS

A bid of $4,719,719 on Section 33, Massachusetts Turnpike, won the contract for J. F. White Contr. Co., Cambridge, and Consolidated Constr. Co., Attleboro, Mass. Among other work, specifications on this 3.89-mile section called for excavating 1,720,000 cu. yd. of earth, 46,100 of rock and 231,800 of peat, as well as handling 507,800 cu. yd. of borrow and 205,000 of gravel.

In the equipment line-up, there was a fleet of Caterpillar units including a D9, four D8s, two No. 90s, one D6, four DW21s, a No. 12, a No. 212, a D337 and two D13000s in draglines. Here you see the Turbocharged CAT* D9 Tractor with No. 9S load-shape Bulldozer pushing fill into a peat bog.

On this well-planned operation, seven scrapers hauled the fill to the D9. Making round trips of about 4500 feet, the wheel-type DW21-No. 21 Scrapers averaged 15.4 pay yards a trip. On shorter hauls, the crawler-drawn No. 90s averaged 22 pay yards a trip. During its 10-hour day, the D9 set such a fast pace for the scrapers that only occasionally was it necessary to have another 'dozer lend a hand with the fill.

For jobs that call for top production, you can't beat the dirt-moving capacity of the giant D9. For complete facts about the new king of the crawlers, see your nearby Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE D9—NEW KING OF THE CRAWLERS

PEAT BOG TURNPIKE

BIG PRODUCTION FEATURES OF THE D9

First Track-Type Tractor with Turbocharger

The D9's Turbocharger is driven by engine exhaust, utilizing energy which would otherwise be lost. It packs air into the engine according to engine load, *not engine speed, for* more *working horsepower.*

Choice of Torque Converter or Direct Drive

To match the tractor to your job, two types of drive are available: the exclusive Caterpillar Oil Clutch with six-speed transmission (both in forward and reverse) or a three-stage torque converter with three gear ranges.

Completely New 320 HP Engine

The powerful D9 Engine features, in addition to the Turbocharger, a 6¼" bore and 8" stroke and runs at 1240 RPM.

Constant Power Drive for Rear-Mounted Equipment

Power for cable controls, direct from the engine's rear power take-off, makes operation completely independent of flywheel clutch or torque converter, boosts operating efficiency.

Easy to Operate

Hydraulic boosters provide power for steering and braking and master clutch operation. The 7-roller track frame provides excellent stability, flotation and ride. The starting engine has an electric starting system and simple single-lever control for easy and convenient operation from the seat. Fast, sure starts in any weather.

Easy to Service

Oil clutch, torque converter, transmission and steering clutches can each *be removed individually without disturbing other components. Hydraulic track adjusters are among the many other features for fast, easy adjustment.*

Almost singlehanded, the D9 handles all the fill brought up by seven scrapers on Section 33, Massachusetts Turnpike, near Framingham.

Back of the D9, a dragline powered by a Cat D337 Engine scoops peat from bog.

placing concrete soon?

from California . . . to New England contractors everywhere use the CRANEMOBILE way

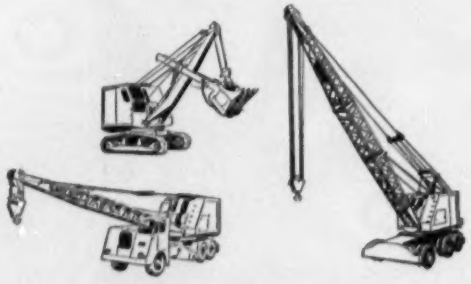
255

Whether your next concrete placing job is like this spillway in California, or like this building in New England, you'll find CraneMobile's sturdy dependability makes all lifts easier. CraneMobiles are available in a number of sizes with crane capacities up to 25 tons and a selection of BAY CITY built carriers to meet all job requirements. Here is a rubber-tire-mounted crane packed with operating advantages and special refinements that mean *bigger value* and greater versatility on job after job.

LET'S CONSIDER JUST A FEW OF THE ADVANTAGES . . .

- **A collapsible high-gantry which permits lifting maximum recommended boom lengths from horizontal without outside assistance.**
- **An accurate, fast, independent boom hoist which raises or lowers boom or boom and load by power only.**
- **A power load lowering device that may be quickly engaged or disengaged to handle lowering of heavy loads smoothly and with precision.**

But that's only part of the story. Why not get complete information from your nearest BAY CITY dealer . . . or write direct for complete catalog.



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EQUIPMENT MAINTENANCE was one of the many big problems at remote air base project in Labrador where there was no such thing as "the nearest distributor." Here a compressor is steam cleaned prior to getting a thorough overhaul in the job shop.

SAFE LABRADOR JOB . . .

continued from page 74

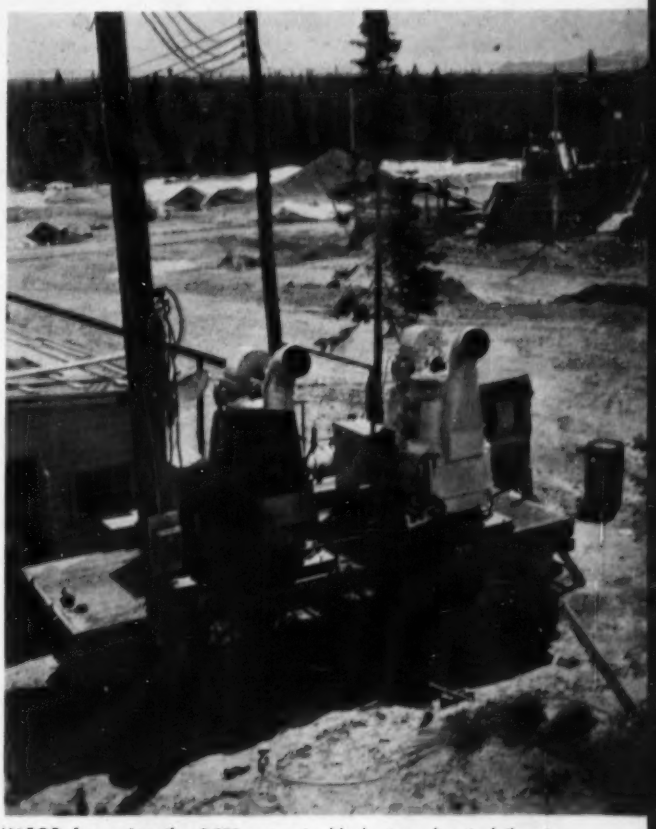
Truck drivers and equipment operators are given special attention. They must pass tests and be licensed by Drake-Merritt. A written test is supplemented by a psyco-physical one that checks such things as reaction time, depth perception, peripheral vision, visual acuity, and color blindness. And they must pass a driving or field operation test in the type of equipment they will run.

But perhaps the most important safety step is taken at the grass roots level. First thing for each employee when arriving at Goose Bay is an indoctrination by the safety staff. Safe practices are outlined, benefits of safety are explained, and the special hazards of that man's trade are detailed, along with ways to eliminate or minimize them.

Safety Teamwork

A spirit of teamwork—that "safety is everybody's business"—is instilled in the worker so that he not only takes care of himself but also watches out for, and cautions, his fellow crew members. It is this that has culminated in the Award of Honor to Drake-Merritt.

The combine is building the Goose AFB under contract from the Eastern Ocean District, Corps of Engineers. Col. Morton Solomon is district engineer and Lt. Col. John Morris is area engineer. For Drake-Merritt, E. A. Pasha is general manager, Clyde Newcomb is project manager, and Frank DiMatteo is project engineer. Chief safety engineer at Goose is Al E. Nollet. Safety consultant to Drake-Merritt is Thomas M. Lively, Minneapolis.



VAPOR for curing the 2,000 concrete blocks turned out daily at Goose Bay was supplied by these two quick-steaming generators.

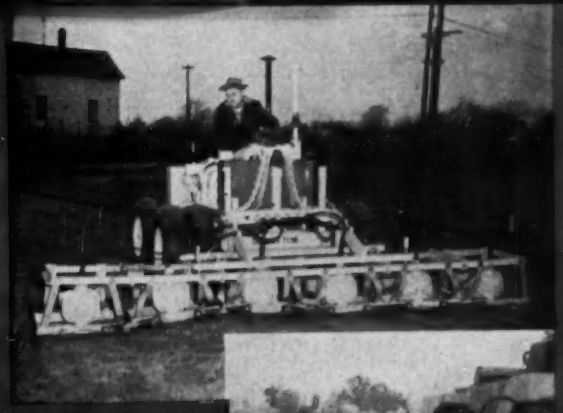
No other Compacting Equipment approaches the Time and Money-Saving On-the-job Adaptability of the Jackson VIBRATORY MULTIPLE COMPACTOR!

It is the only compactor having in its workhead 6 independent compactor units which can be individually as well as simultaneously operated. It is the only compactor in which the compactor units may be grouped and regrouped on the job to ideally fit each and every compaction project (see illustrations). Standard width 13′3″. This extraordinary flexibility is a tremendous time and money-saver. It provides perfect coverage with no lost motion, and makes it possible to get into places with the JACKSON that other equipment can not touch. Any individual unit may be detached and fitted with a furnished operating handle to convert it to the identical and very popular manually-guided, self-propelled Jackson Compactor, so widely used on a multitude of small jobs, for perfect consolidation in places inaccessible to other equipment.

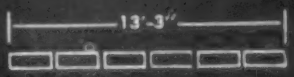
EACH OF THE COMPACTING UNITS IN THE JACKSON MULTIPLE COMPACTOR DELIVERS UP TO 4200 TWO-TON BLOWS PER MINUTE. Hence, specified densities are quickly achieved in granular soil bases, sub-bases and all materials normally used in macadam bases and pavement widening projects, large fills and similar jobs.

The Jackson Multiple Compactor is by long odds the handiest, most convenient and efficient compacting machine on the market today. It will save you many, many times its cost in both time and money. See it at your nearby distributor. His name and literature on request.

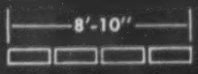
JACKSON VIBRATORS, INC. **LUDINGTON, MICHIGAN**



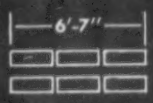
In the photo at right note how the end compactor unit automatically, without any adjustment, assumes the correct position to consolidate the shoulder of the base course to prevent raveling and erosion.



Utilizing the 6 Compacting units in line for maximum width (13'3") coverage. Working speeds: 0 to 60 ft. per min. Reverse: 5½ miles per hour.

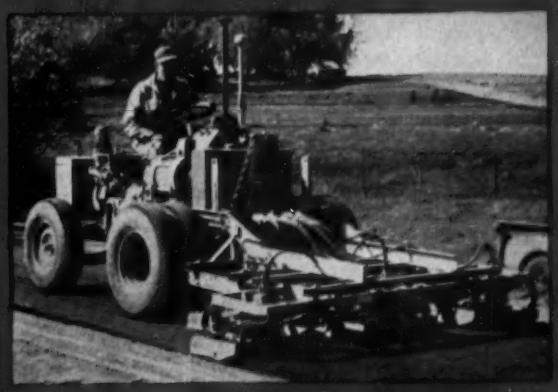


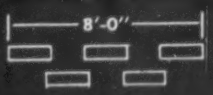
In this application the number of compactor units has been reduced to 4.



"Three following three" tandem arrangement of compactor units ahead of tractor, for maximum, one-pass consolidation of granular base course.

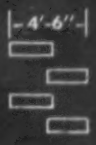
Furnished with operating handles, single compacting units may be used for jobs like these: Left: Consolidating gravel back-fill adjacent to parking lot retaining wall. Right: Consolidating bituminous concrete pavement up close against building wall — not accessible with other equipment. Unit compactor bases supplied from 12" to 26" in width.





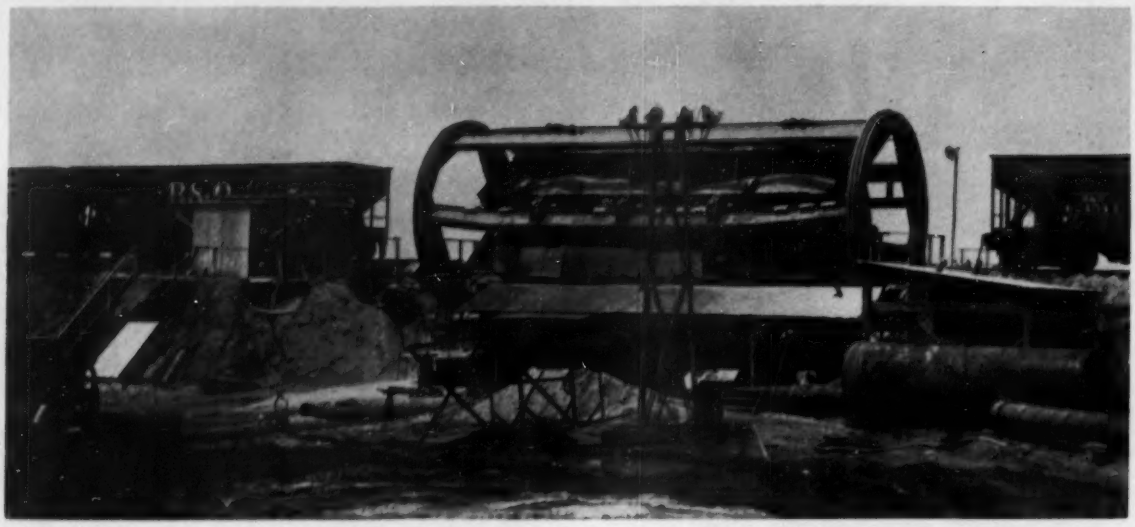
AND VARIABLE

This arrangement was adopted for the 4" to 5" bottom course of a 24' soil-cement paving project. Variable in width within limits.



AND VARIABLE

Towed at the side, this arrangement of compactor units provides perfect, one-pass consolidation of widening course. Variable in width within limits.



HUGE DUMPER rotates 65-yd railroad car above hog box. Underneath, high-pressure monitors sluice sand to mixing well where dredge pump picks up slurry and sends it out to fill. Two men handle car coupling, and one operates dumper controls.

Car Dumper Feeds Sand to

PIPELINE heading out from dredge pump breaks into two sections at fill area. Valves control flow. Sand drains will be driven through fill and topped with surcharge.

A RAILROAD-CAR DUMPER teamed with an ingenious pumping setup is doing a fast job of placing an hydraulic sand fill over a waterfront swamp at Port Newark, N. J. Developed by George M. Brewster & Son, Inc., the unique combination is placing an average of 8,000 yd per 16-hr day. And on good days, it turns out more than 10,000 yd.

The Bogota, N. J., contractor has a $1 million contract with the New York Port Authority calling for the placing of 500,000 yd of fill for a new wharf on Newark Bay. It also includes the driving of 100,000 linear ft of vertical sand drains through the fill. Contract time is only 3½ months.

Specifications require three grades of material—one for fill, another for surcharge, and a third for sand drains. All three are tough to find in the area, especially sand drain material. It must have no particles larger than 3 in. and must contain not more than 40% of particles retained on a ¾-in. sieve. Material passing the ¾-in. sieve may have only 0 to 3% by weight passing the #200 sieve.

After detailed investigations, Brewster engineers decided on a sand pit about 60 mi from the site in Lakewood, N. J. This single source of material would meet specs for fill, surcharge, and sand drains. Besides, the pit was serv-

MIXTURE of sand and water pours from 12-in. dredge pipe and builds up fill at Newark Bay waterfront. Excellent mixing by monitors produces mixture with up to 20% solids. Sand is built up in 4-ft lifts, and water runs off into bay or ditches.

High-Capacity Pumping Unit

iced by the Central Railroad of New Jersey, which had plenty of cars available for hauling.

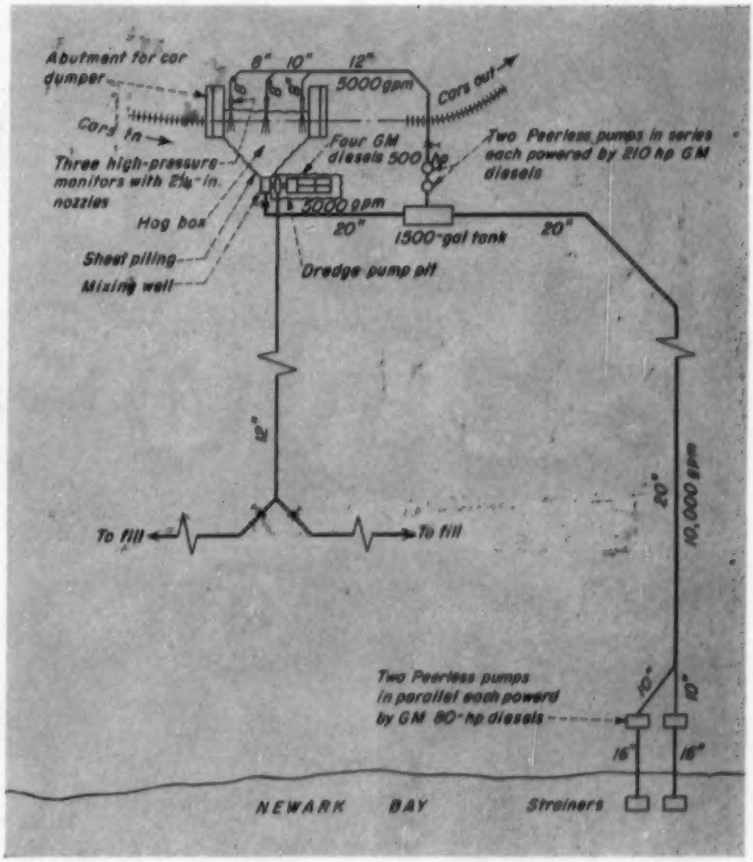
The big problem was how to unload the cars quickly at the waterfront site to maintain a fast placing rate. Placing would be done by hydraulic methods because it was the most economical and also because pumping action would wash out fines and assure uniform gradation.

Brewster's solution is a huge car dumper, capable of unloading a string of 65-yd cars at the rate of one every 4 min. It's a big investment, but there's no better way to dump cars at a rate of 180 a day. Besides, the contractor hopes to spread the rig's cost over future jobs.

Brought in from Garrison Dam where it had been unloading riprap, the dumper was erected on two concrete abutments just beyond the extremes of the fill area. A mile of track was laid to connect the dumper with a main line of the Central Railroad. Half the tracks are carried on a built-up ramp leading up to the dumper, and the other half run back down to the line.

At the Lakewood pit, cars are loaded by a 4-yd clamshell and a 3½-yd dragline. Strings of cars are moved past the loading areas by locomotives or tractors. When the bank is excavated back far enough,

(Continued on page 87)



PUMPING UNIT takes water from bay, mixes it with dumped sand and pipes slurry to fill. Water is pumped from bay to tank, where two pumps force it to three high-pressure jets.

GREAT NEW IDEA in

52 hp **WORK BULL Model 404** with ⅝-yd. low-pivoted loader. Like all WORK BULLS, 404 has specially designed industrial front axle and heavy-duty clutch. (Diesel engine is optional.)

42 hp **WORK BULL Model 303** with angle dozer and backhoe. Gasoline engine, standard, offers high torque at low speed for better lugging. (Diesel optional.)

34 hp **WORK BULL Model 202** with hydraulic-controlled hoe. Most of the WORK BULL attachments can be switched in 5 to 15 minutes in the field — without special gear.

42 hp **Davis PIT BULL** with ⅞ yd loader features torque converter, reversing clutches and 5 speeds forward, 5 reverse. In many cases it outworks high-priced, single-purpose rigs.

tractors and attachments—

M-H-F

WORK BULLS

NOW — from one source — a package of 5 versatile, low-cost tractors with 20 power-matched, easily-interchangeable attachments!

Contractors! Industries! Utilities! Profit from this new idea in greater machine utility and efficiency. Get the benefits of low cost attachment interchangeability . . . the high-profit performance of tools matched to power and speed . . . the adaptability of job-matched equipment to replace or supplement high-priced, single-purpose units.

What's more, you enjoy the advantages of a single sales and service source — a complete package — available only in the low-cost WORK BULL line.

New, and built to excel where other wheel tractors fail, WORK BULLS pay off in a wide variety of applications . . .

As primary equipment, WORK BULLS put former hand work on a power basis . . . efficiently handle scattered, work-and-run assignments.

As backup machines, WORK BULLS team with medium-priced, single-purpose equipment . . . give you the power equipment ratio that exactly fits the job.

As utility or cleanup tools, WORK BULLS are perfect for hustling around big layouts and relieving big equipment of unprofitable odd-job duties.

Get the complete WORK BULL story now. Write for 24-page illustrated catalog.

IMPORTANT NOTE TO RETAIL DISTRIBUTORS — WORK BULL franchises are still available in a few key areas. Write or wire for details.

FORK LIFT **Fork Lift Model 202** has lifting capacity of 1500 lbs at full height, 4000 lbs at half height. Optional mast gives lift heights to 21 ft. Works on or off hard surface.

Look at this wide choice of integrated WORK BULL attachments!

LOADERS—9 or 11 cu. ft.; ⅓-yd. or ⅞-yd.

BACKHOES—12, 16, 20, 24 or 36" buckets

MOWERS—Reel, rotary or side-mounted

FORK LIFTS — 2000 and 4000 lb. capacities

BLADES—Bull dozer, angle dozer or grader

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Division of Massey-Harris-Ferguson, Inc.

11-1 Quality Avenue **Racine, Wisconsin**

Set your sights on an Allis-Chalmers HD-6B

built for business on both ends

Here's what Roy Worthington, Hermitage, Missouri, says about his HD-6 with hydraulic bulldozer and rear-mounted ripper:

"More yardage per day." Production moves fast when this HD-6 team digs in. A rear-mounted hydraulic ripper plows through rock and dirt, loosens it for faster, more efficient dozing on this quarry exploration job.

"Better maneuverability." On steep hillsides or in rocky ravines, the HD-6 with 15,850 lb and almost 7 ft of track on the ground, keeps sure-footed balance. Fast-acting controls, easy shifting and full visibility put the operator in full command of his work at all times.

"Smooth-running, constant power." This is what Roy Worthington said about the 55-belt-hp Allis-Chalmers diesel engine. It delivers power for big output and has ample reserve. Stripping topsoil or digging ponds, the HD-6 is powered for more production, lower job costs, longer life.

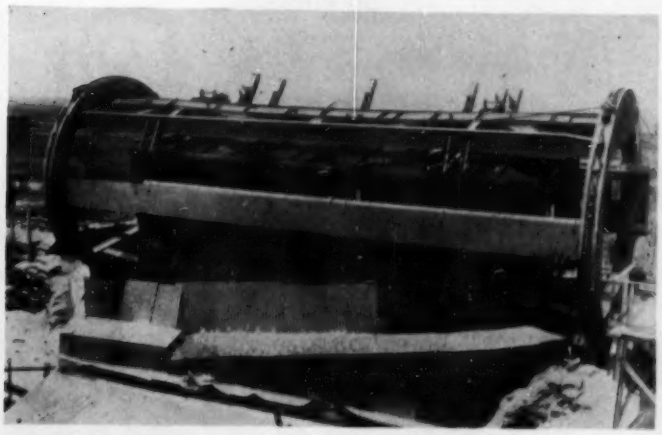
"Simplified maintenance." Worthington's operator can leave his grease gun home for one to two weeks because the shortest lubrication interval is a full 75 hours! What's more, the HD-6 has *1,000-hour* lube intervals on truck wheels, support rollers and idlers. This eliminates daily greasing, converts maintenance time to production time.

"Excellent service." Owners know how Allis-Chalmers construction machinery dealers work with them to keep their Allis-Chalmers equipment in tip-top shape. See the dealer in your territory soon. He'll be glad to tell you more about the HD-6 and show you one at work.

HD-6B
45 drawbar hp
55 belt hp
15,850 lb

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



BRACKETS clamp car in dumper. They operate automatically. Dumper is rotated by cables wrapped around big end rings.

65 yd of sand falls from railroad car into hog box. Massive dumper can unload string of cars at rate of one every 4 min.

the clamshell loads cars through a hopper and conveyor. Trains of 50 loaded cars each pull into Newark several times a day, and empties return to the pit.

At the dumper, a rented locomotive pushes 15 cars at a time up the ramp. One by one they are unloaded and pushed onto the descending ramp. Brakes on the first empty car keep the train together until the full string has been unloaded. Then the locomotive pulls the empties back to the main line.

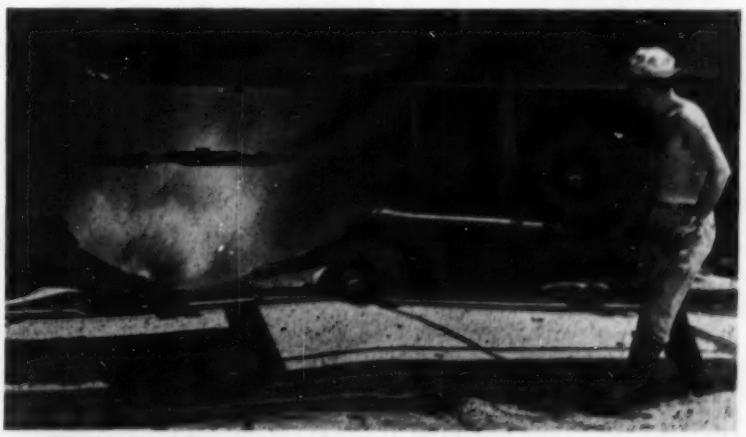
Car dumping is fast. A General Motors diesel-generating set supplies electricity to a motor mounted behind the dumper. The motor transmits power through a system of shafts and gears to a pair of drums which are connected to cables wrapped around steel rings at the ends of the dumper. The rings rotate on wheels and revolve the dumper 180 deg.

When the dumper begins to turn, counterweights drop brackets which hold the car in place during the turn. They remove themselves automatically when the car returns to its normal position.

A full load of sand dumps from a car in a matter of seconds. It falls into a hog box and is hit by three high-pressure monitors. Men play jets against the dumped sand, and the slurry is funneled by a hog box to a screened opening at the top of a mixing well. About 6 ft below, near the bottom of the well, the sand and water mixture is sucked into a dredge pump mounted at the base of a sheeted pit. Four General Motors diesel engines with a total of 500 hp power the big pump.

(Continued on next page)

THREE JETS of water from high pressure monitors play on dumped sand, sluicing it from box to mixing well, where slurry is picked up by pump and piped to fill.



MONITOR with 2¼-in. nozzle is mounted at edge of triangular hog box. Its piercing jet continually plays across dumped sand. Three parallel monitors cover complete hog box.

DREDGE PUMP at well is powered by 500 hp unit consisting of four GM diesels.

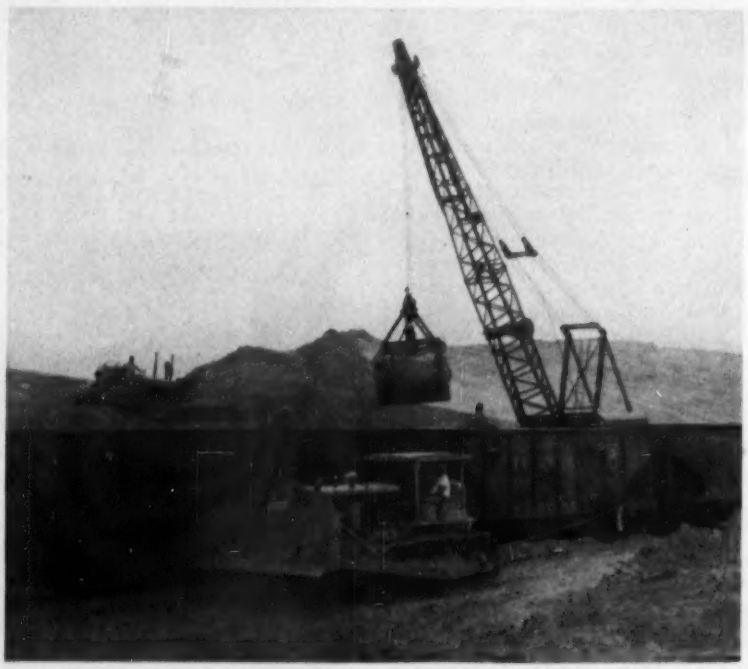
PAIR OF PUMPS powered by two General Motors diesel engines sends 5,000 gpm from surge tank to trio of monitors. Water also can be pumped directly from tank to mixing well.

Because of excellent mixing by the monitors, the slurry contains an unusually high solids percentage of 20%. From the pump, the mixture is forced out in a 12-in. pipeline to the fill. Sand is built up in 4-ft lifts as the water runs off into the bay or into a drainage ditch. Maximum length of discharge line is about 1,500 ft.

High pressure water for the monitors is pumped from the bay to a surge tank by two Griffin units connected in parallel. They consist of Peerless 10-in. pumps powered by two GM 80hp diesels. From the surge tanks, two more Griffin units connected in series pump 5,000 gpm to the monitors.

When a fill area reaches the required grade, sand drains are driven through, and a surcharge is built up on top.

Earl Hoy is project manager, and Peter Berzine is project superintendent for George M. Brewster & Co. Carl Rupp is resident engineer for the New York Port Authority.



AT SAND PIT Caterpillar dozer pulls train as 4-yd Link-Belt clamshell loads cars. When bank is cut back far enough, clamshell loads cars through hopper and conveyor.

Raves for no ravin' beauty...

"What a beating! But in 12 years, trucks have never had a lubrication failure!"

FOX RIVER'S MIGHTY MACHINES all provide trouble-free performance using Cities Service Gasolene, Diesel Fuel, and Lubricants. These outstanding products help the company operate at 150 tons per hour.

THAT'S DUST, BROTHER! This motor, buried in dust, is typical of operating conditions at Fox River Stone Company. Yet, using Cities Service Pacemaker Oil, there's never been a bearing failure. Never any lubrication problems.

Fox River Stone Company, Elgin, Illinois, reports trucks wear out externally, are still good internally using Cities Service Lubricants.

Operating at the rate of 150 tons per hour under the toughest conceivable quarry conditions, Fox River Stone Company produces barn and agricultural lime, 2" and 3" stone for road construction, "A" and "B" binder for asphalt road construction, flagstones, and a host of other crushed stone products.

Yet, during the last 12 years, there's never been a lubrication failure of any kind in any piece of machinery using Cities Service Lubricants.

With the aid of Cities Service Gasolene, Diesel Fuel, and Trojan H-2 Multi-Purpose Grease, Fox River's many shovels, pay loaders, and trucks have given constantly flawless performance. And despite the extremely dusty quarry conditions, exposed electric motors have never lost a bearing using Pacemaker 150 T Lubricating Oil.

Not one lubrication failure in any of this equipment during 12 years of rugged operation! That's Fox River's record with Cities Service and it can be your record when you start using Cities Service Products. For information, talk with your nearest Cities Service representative or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

HEAVY-GAUGE
METAL CONSTRUCTION

SIMPLIFIED
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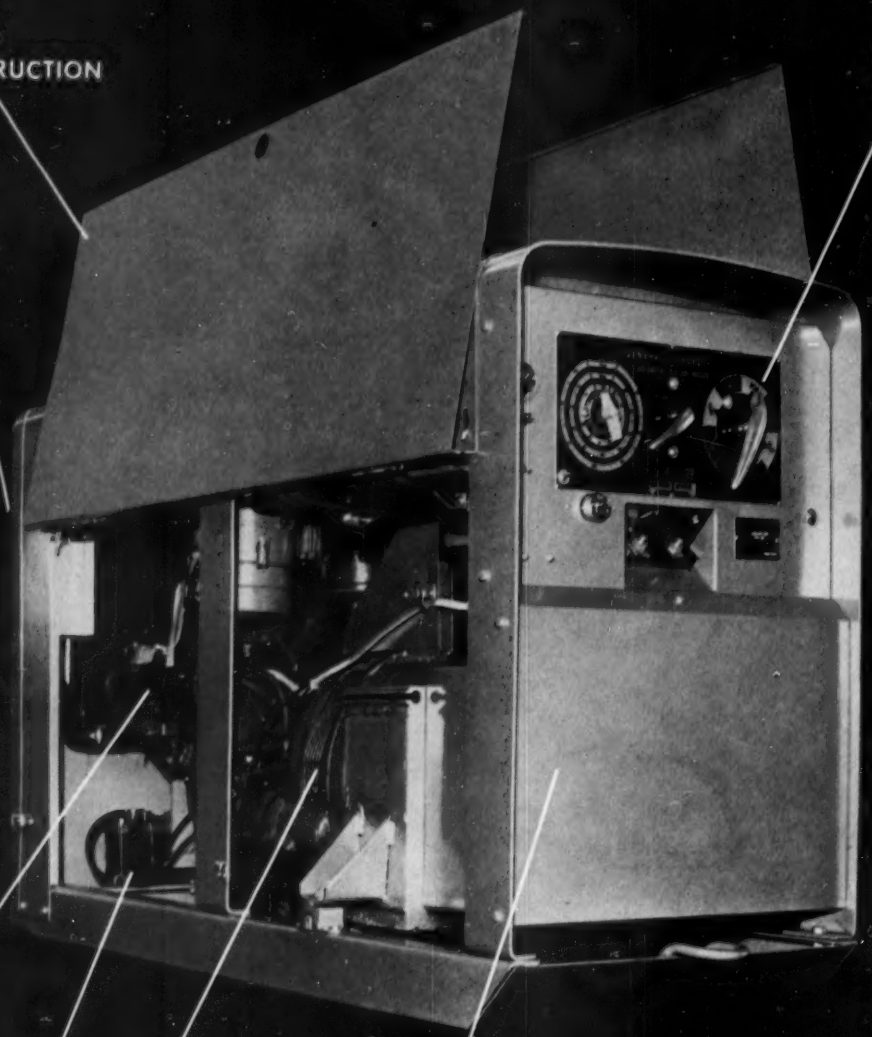

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ENGINE FAN

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STARTING BATTERY

DIRECT-COUPLED
ENGINE AND GENERATOR

NON-PROJECTING
GENERATOR

NOW—AVAILABLE IN 200-, 300-, 400-AMP MODELS

Prove it to yourself— Make this actual feature-by-feature comparison of General Electric engine-driven welders with two other lines of engine-driven welders. You will see that only the new G-E welders have so many advanced design features for better welding at lower cost.

EASILY PRESET Electrode Selector, Current Dial—Dual controls make current setting easier and more accurate.

GENERAL ELECTRIC	✓	
MANUFACTURER A		
MANUFACTURER B		

How General Electric's NEW Line of Engine-driven Welders Can Help You Meet Contract Deadlines

Advanced design assures less "downtime," minimum maintenance—for faster, lower-cost welding

Nothing stretches out construction time more than unreliable or obsolete equipment. Such equipment increases your maintenance costs and results in nonproductive "downtime." It may even lead to contract fines and loss of repeat business.

To reduce construction delays, General Electric's new line of engine-driven welders has been designed and field-tested for maximum durability and minimum maintenance—without sacrifice in performance. These new 200-, 300-, and 400-amp welders save for you with the following advantages:

SAVE YOU TIME—Sturdy construction, the dependable Hercules engine, new-design generator, and simplified control all combine to give you steady output, longer operating time between overhauls, and reduced maintenance. This means more production per machine . . . per man-hour.

SAVE YOU MONEY—General Electric engine-driven welders begin saving you money the first day on the job. For example, the deep-sump crankcase provides complete lubrication to all moving engine parts—up to a 15-degree tilt in any direction. This helps to reduce costly breakdowns. And the over-all advanced design assures you of more and better welds at less cost, with a reduction in costly downtime for maintenance and repair. Additional General Electric advantages are described below.

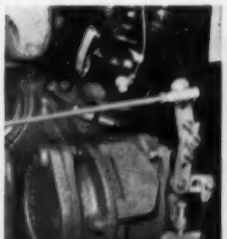
For more information about how General Electric engine-driven welders can help you, contact your nearby General Electric Welding Distributor. He is listed in the yellow pages of your telephone book. Write for descriptive bulletin to Section 714-5, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

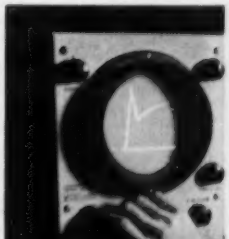
CONSTANT-PRESSURE Brush Springs—Right pressure maintained for life of generator brushes without adjustment.

PRELUBRICATED Generator Bearings—Ball bearings prelubricated with sufficient grease for years of service.



DEPENDABLE Geared Governor—Gear-driven governor maintains close speed regulation for best welding.

PUSHER-TYPE Engine Fan—Large diameter pusher-type fan circulates ample cooling air for engine and generator.



CONTROLLED CURRENT Peaks—Current peaks are controlled. Arc can be crowded with no "stumbling" or "freezing."

	✓	✓	✓	✓	✓
		✓	✓	✓	
				✓	

Within this circle of machines is the mechanic's truck, a sign that...

Maintenance Is Key To Survival on Seaway

EQUIPMENT on the St. Lawrence Seaway and Power Projects is fighting a tough battle for survival. Mother Nature has combined all her forces to make working conditions about as rough as you will find anywhere. The weather has been unusually wet, and the ground is a lot more stubborn than most contractors expected.

Marine clay and glacial till are the main culprits. They underlie virtually the entire area. And to make things worse, it's tough to estimate where clay will end and till will begin.

The clay sticks to everything; it is tough to handle, either wet or dry, and a problem to dispose of. Glacial till is even worse. It's as heavy as concrete and must be shot to excavate. Yet when wet, it turns into soup, making haul roads almost impassable and subjecting drive lines and transmissions to extreme torture. Wet or dry, it's super abrasive and halves the normal life of many components. Tractor track rails, for example, are shot after only 1,500 hr.

Rigid Program

The maintenance problem is immense. Contractors who expect to weather the storm have invested heavily in rigid preventive maintenance programs and well-equipped repair shops. It's serious business along the St. Lawrence, because more than one firm already has gone under.

One of the biggest fleets of equipment is operated by Peter Kiewit Sons' Co. and Morrison Knudsen Co. on Cut "F" (photo above) a diversion channel for Long Sault Dam. Nearly 6,000,000 yd have been moved by 50 hauling and dozing units. They work two 8-hr shifts, leaving the third shift for greasing and oil changing. Two mobile rigs with a 10-man crew cover the fleet each night.

The most vital phase of the preventive maintenance program is the weekly and monthly check system. Each rig gets a rough inspection each week and a thorough one each month. Weeklies are made at the job site, and monthlies are conducted in the shop.

On Euclids, for instance, Kiewit follows a nine-step check list. Six steps are covered each week and all nine every month. The complete list consists of cooling system, electrical system, operating controls, track assemblies, attachments, sprocket bearings, engine turn-up, fuel system, and bolts.

But preventive maintenance is only part of the program. Emergencies continually arise from broken drive lines, damaged trans-

THE NEWEST LORAIN 35 TON Moto-Crane

MC-530W

***Now*... a brand new, big capacity crane on rubber that can be moved over the highway!**

Easily stripped down... front and rear outrigger beams and boxes and rear counterweight are completely removable... this new, heavy-duty, highly mobile Lorain can quickly travel the highway from job to job.

It opens up new avenues of profits for busy contractors. Read some of its advantages below and make a date to have your nearby Thew-Lorain Distributor tell you the *full* story!

CARRIER FEATURES

- An entirely newly designed Carrier—28' 6" long, 122" wide—longer, heavier, stronger.
- Removable front and rear outrigger beams and boxes for road weight reduction.
- Hydraulic assist steering—does 80% of the work.
- Gas or *Diesel* Carrier Engines.
- Carriers Available As
  6 x 4 (non-driving front axle)
  6 x 6 (driving front axle)
  8 x 4 (2 non-driving front axles)
- 10-or-15-Speed Transmission sets are available.
- Also available in 108" width with 30-ton capacity (MC-530).

TURNTABLE FEATURES

- Removable rear counterweight for road weight reduction.
- Gas or Diesel Turntable Engines.
- Hydraulic Coupling—also Torque Converter Power Take-off.
- "Shear-Ball" mounting — no rollers, no center pin, no adjustments.
- 3-position Turntable mounting plate—adjustable for digging ranges or maximum crane capacities... can travel with heavier loads over the rear.
- Fully air-controlled 2-lever "Joy Stick" operation available.
- New, heavier duty hoist clutch, 2-piece design.

BOOM FEATURES

- Alloy steel, square-tubular-chord boom—lighter, stronger, more capacity... longer booms (up to 110 ft.).
- Pin-connections — easy, fast, simple. Boom may be folded for shorter travel length.
- Tip-extensions—2-piece, 20' design, extensible to 30, 40 ft.
- 14-ft. square-tubular-chord Mast Gantry.
- Booms with extra wide bases available for extra long boom service (up to 130 ft. —170 ft. with tip).

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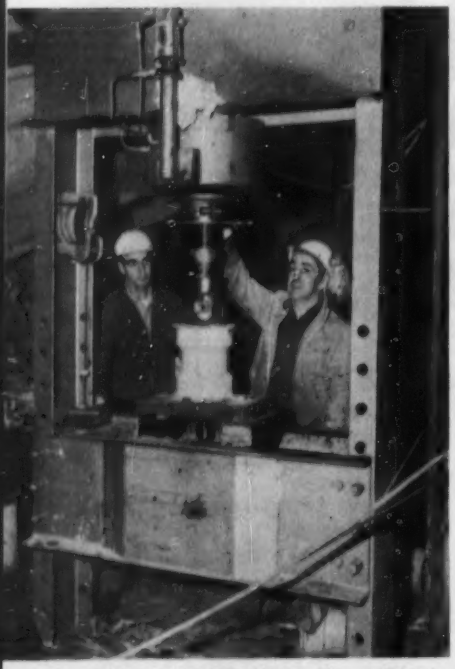
YOUR THEW-LORAIN DISTRIBUTOR WILL GIVE YOU THE LATEST NEWS

THEW LORAIN®

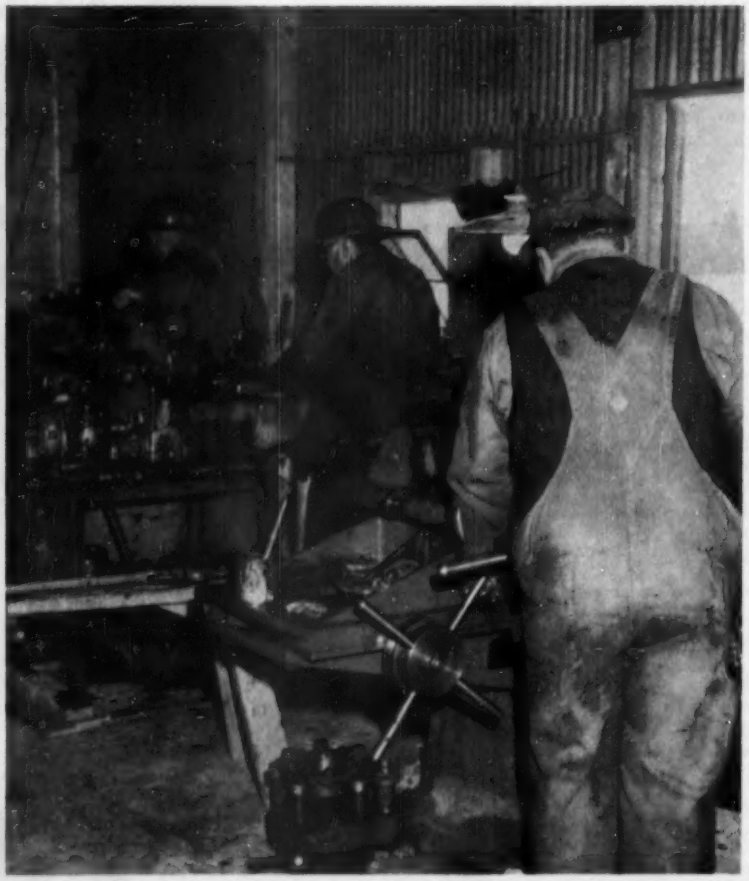
Shop Equipment Handles Major Parts Rebuilding

CRANES AND HOISTS scattered throughout job shops handle all but lightest lifts.

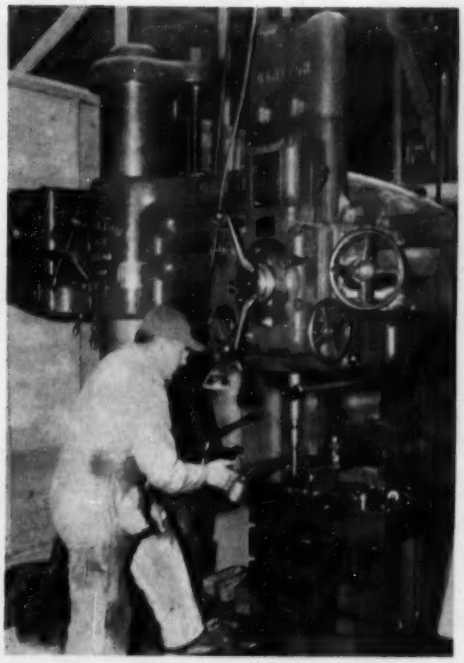
ELECTRICAL TEST APPARATUS in PK-MK shop includes this Allen distributor synchronizer and Lenoke armature growler. Shop also has Vixen sparkplug cleaner, armature lathe, spares.



HYDRAULIC PRESSES handle varied jobs. Here a 150-ton Dake press forces a bushing into a tractor track roller for PK-MK.



PIPE THREADERS, two Beaver machines and one Oster, turn out needed pieces for Perini.



RADIAL DRILLS, such as this big Carlton unit in Perini's shop, can fix parts fast.

SEAWAY MAINTENANCE . . .
continued

missions, or worn engines. One mechanic is stationed right with the trucks and tractors in the field. Another just handles the shovels and draglines. When either of them need more help, they can call on a temporary shop nearby, where there are four mechanics and a foreman. This shop, in turn, is backstopped by a 80x140-ft main job shop.

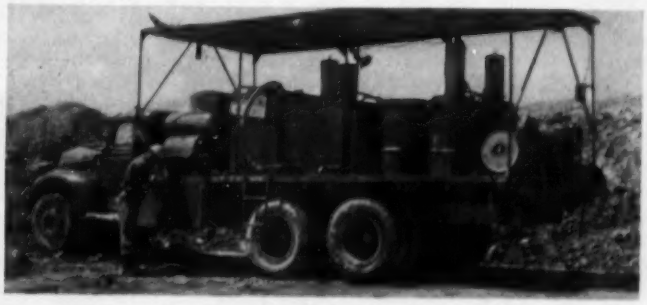
On major repairs, Kiewit doesn't waste any time in the field. He brings the rigs right into the main shop, yanks the worn assemblies, replaces them with spares and sends the rigs back to the ready line. Because of the availability of local machine shops, the contractor farms out most of his heavy rebuilding work.

Kiewit keeps accurate records of all maintenance work. With these records, they compute availability percentages for each rig and then determine averages for the four main types of equipment—shovels, trucks, dozers, and service trucks. Percentages are plotted each week on a graph to give the contractor a quick measure of the effectiveness of his maintenance program.

(Continued on page 98)

SWING CRANE handles maintenance lifts. Dutcher made 3-ton unit from surplus Army 6x6, LeTourneau PTO winch, D6 dozer cylinder.

VERTICAL-LIFT CRANE on Perini job is just a welded boom and jib mounted on Ford truck and actuated by a Mack dump-truck cylinder.



TYPICAL LUBE RIG carries 75 cfm Jaeger compressor, Aro power lube units, water, gas, four oils, and two greases, all on Dodge truck.

REPAIR UNIT at Barnhart Island Power Plant is Chevrolet truck with Lincoln welder, gas cutting equipment, tools, wire rope.

Barber-Greene Finisher paving one of the many steep, hairpin turns in the Green Mountains of Vermont.

Hairpin turns with a mountain-climbing finisher

Here's a grueling test of superior traction; yet, the Barber-Greene Crawler-Mounted Finisher provides positive traction and steering even while pushing loaded trucks up steep grades on slippery primes or on soft bases. Short over-all length and crawler traction also assure superior maneuverability . . . save time when paving a mountain road or a downtown boulevard.

These and other unique design features combine to give Barber-Greene Finishers their world-wide reputation of outstanding performance.

Top paving speed and positive traction: The Barber-Greene will lay any mix as fast as any paving machine now in use, with the same surface quality. Widest choice of laying speeds lets the operator select the optimum speed for the job and the mix.

Ease of control . . . superior maneuverability: Operator has unrestricted view of truck dumping, material level in spreading screws and finished mat.

Time-saving hopper: Receiving hopper is amply wide for fast truck changes and easy discharge without spillage.

World-wide service and parts: Available from local stocks on short notice all over the free world.

Crawler traction provides easier maneuverability—saves time and space when turning around.

Write for literature on this pace-setting finisher.

56-27F

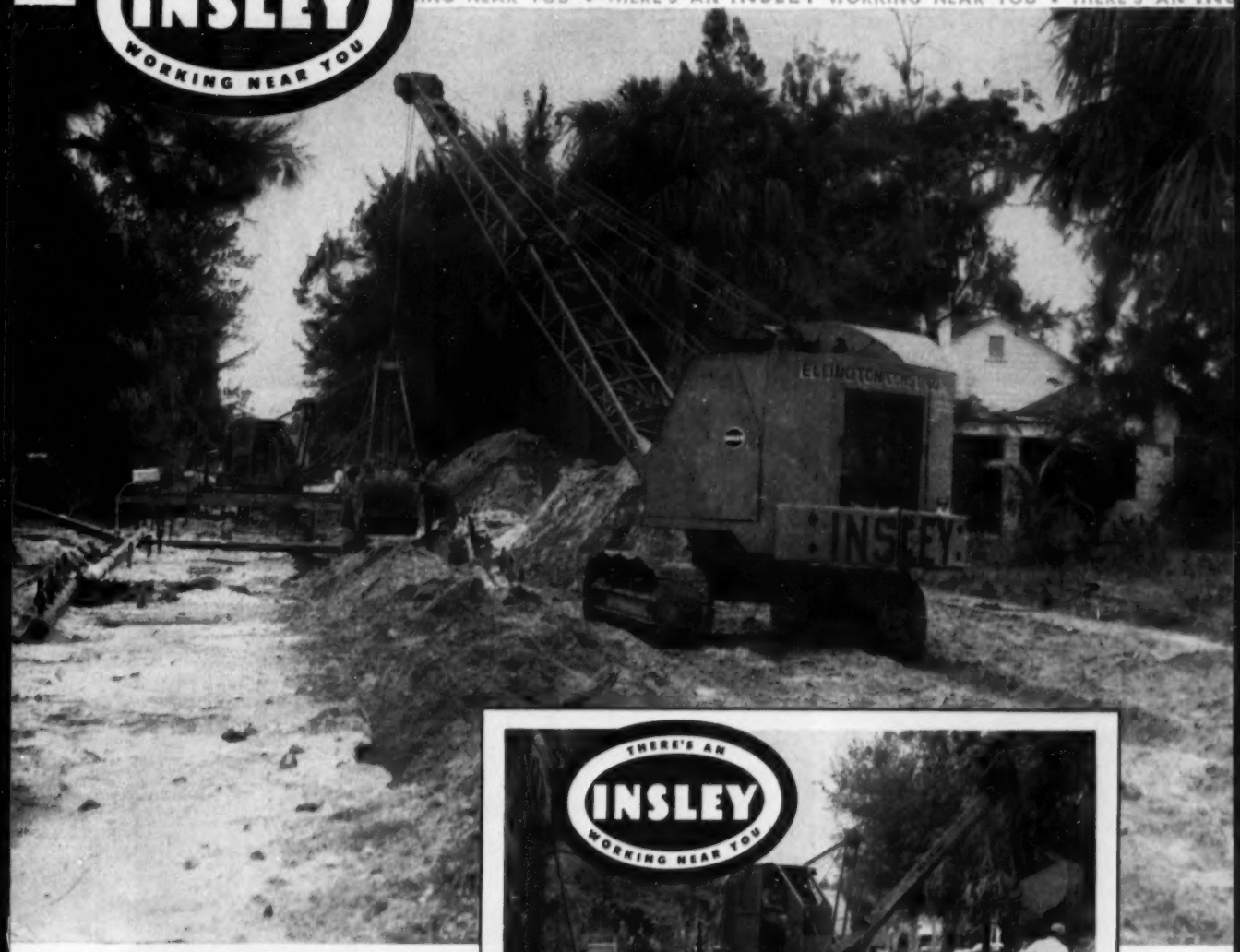
See you at the ROAD SHOW

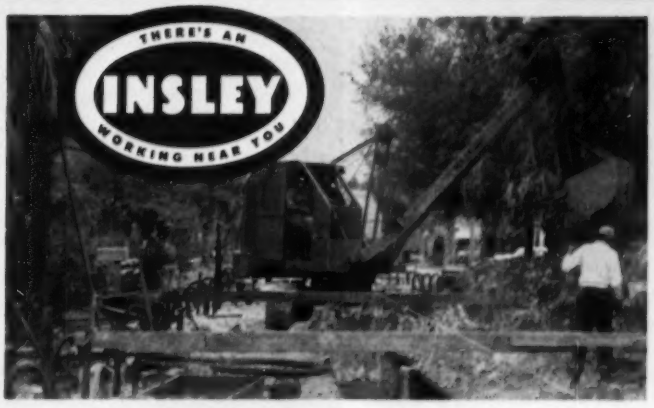
Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

THERE'S AN INSLEY WORKING NEAR YOU





The Insley Manufacturing Corporation of Indianapolis has been manufacturing construction equipment since 1907.

The Insley line includes excavators and cranes 5 to 35 ton capacity—crawler or rubber mounted. Let your Insley distributor "show you an Insley at work."

Recognized as standard equipment by highway contractors for excavating and trenching—Insley's proven design characteristics give the contractor a dependable machine—simple to service, easy to maintain. Insley's rugged dependability means minimum down-time and more production hours.

INSLEY MANUFACTURING CORP. • INDIANAPOLIS, IND.

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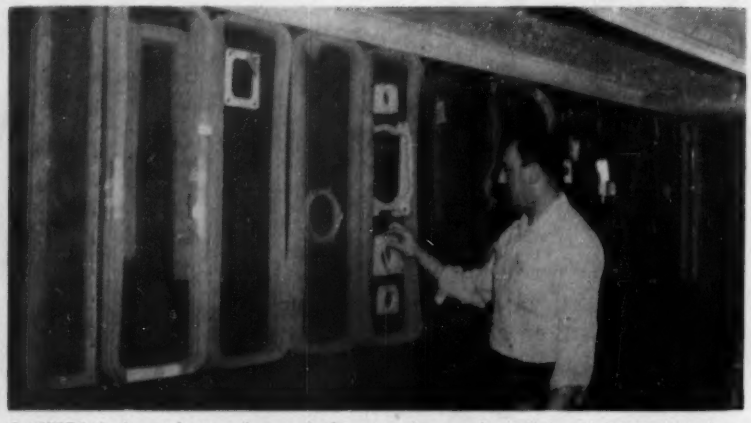
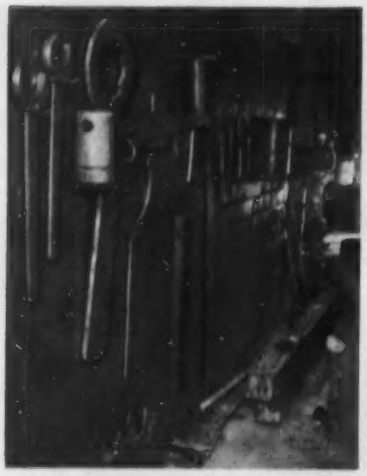
Special Racks Keep Track of Tools

HOSE is kept handy in wall storage rack made by M-K of wires with hooked bottoms.



GASKETS don't get lost or damaged when stored on perforated board fitted with adjustable pegs and hooks as at this L. B. Smith equipment distributor branch near Seaway.



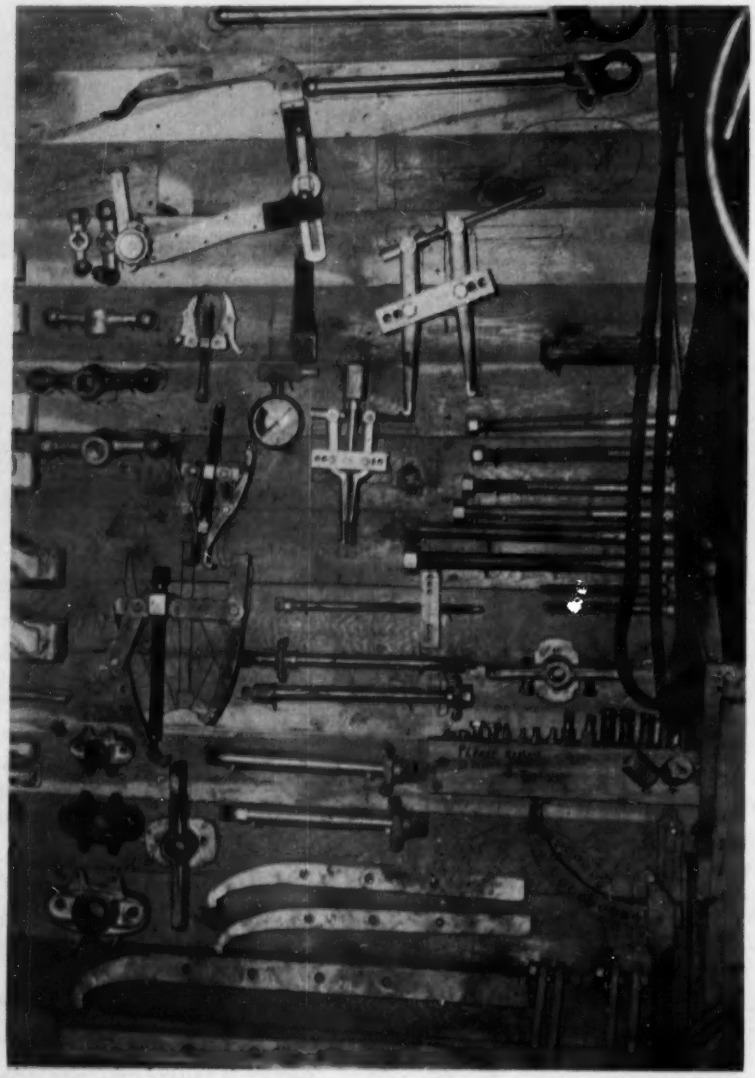
LARGE TOOLS line walls of most job shops, many of them made by job mechanics.

SEAWAY MAINTENANCE . . .
continued

Other big fleets of equipment are operated by combines headed by B. Perini & Sons on Barnhart Island Power Plant, Walsh Construction Co. on Long Sault Dam, Morrison-Knudsen Co. at Eisenhower Lock, and Dutcher Construction Co. at Grass River Lock.

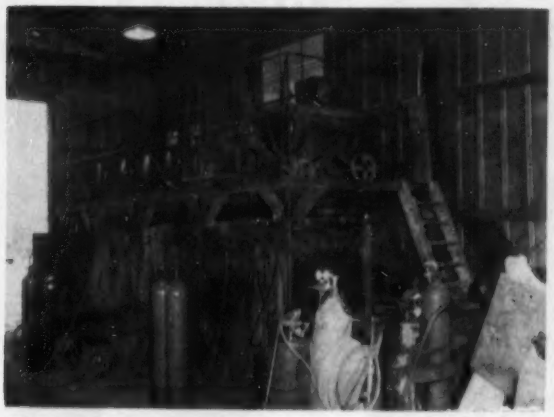
Machine Shops

Perini has one of the most extensive shops. The main repair shop is a 50x300-ft Butler steel building. It has eight repair bays plus storage. A separate building houses a cable shop, machine shop, and pipe shop. The machine shop is well equipped. It has a Monarch 18-ft lathe with 30½-in. swing, a Gould & Eberhardt 28-in. shaper, and a Carlton radial drill with a



SPECIAL DEVICES have their own designated places on shop wall at the Eisenhower Lock Project, as indicated by outline drawings. And both outlines and tools are numbered.

Big Shops Offer Many Services



WELDING AREA takes up small amount of space in repair shop. Welding generators are mounted above enclosure out of way.

LUBRICATION SHED offers quick service. U-shaped walkway provides easy access to top of rig as underside is lubricated.

REPAIR SHOP of Peter Kiewit Sons' Co. is 80x140 ft. It has two 5-ton overhead cranes and several smaller ones. Building also houses parts department.

Small Tools

TRUCK WHEEL is disassembled and repaired. Tray of Snap-On tools is handy.

WAREHOUSE at Perini's job stores thousands of parts, materials, and small equipment. Most materials and heavy pieces are handled on pallets by Buda fork-lift trucks.

TRACTOR is worked over by team of mechanics as part of Kiewit's checkup program.

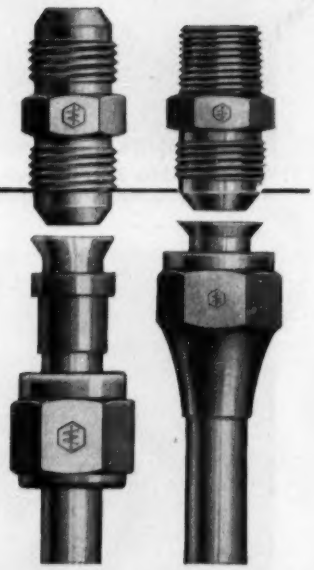
Do You Have Problems With ...

- ☑ VIBRATION
- ☑ PRESSURE
- ☑ SURGE
- ☑ TEMPERATURE
- ☑ CORROSION

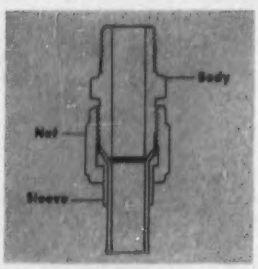
Reduce your production worries to a minimum with these new Weatherhead tube fittings. Two or three-piece styles in all popular sizes.

WEATHERHEAD FLARE-TWIN*

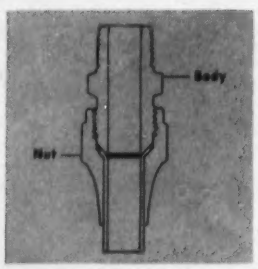
*Trade name for the new Weatherhead 37° flared fitting—SAE, JIC, and ASME approved.



Here's HOW Flare-Twin Works!



3-PIECE



2-PIECE

Here's WHY Flare-Twin Works!

VIBRATION—Sleeve acts as a dampener to resist vibration . . . also as reinforcement to tubing at critical vibration points. In the 2-piece fitting the extra-long taper on the nut does the same job as the sleeve on the 3-piece.

PRESSURE AND SURGE—Flare-Twin fittings will easily withstand normal pressures commonly encountered in most standard hydraulic systems.

TEMPERATURES—Flare-Twin fittings may be used at temperatures applicable to any hydraulic installation.

CORROSION—New Weathercote† finish is resistant to non-flammable hydraulic fluids as well as petroleum base fluids.

†WEATHERCOTE—trade name for the new Weatherhead finish—meets all SAE specs for corrosion prevention.

WEATHERHEAD

The Only Complete Hose and Fitting Line

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Shops Make Alterations, Too

SLOP-TIGHT TAILGATE is added to Euclid rear dump to haul soupy material on Peter Kiewit-Morrison-Knudsen excavation.

SEAWAY MAINTENANCE . . .
continued

4-ft arm on a 13-in. column. Other machines in the shop include a Landis threading machine, a Delta drill press, a Johnson steel band saw, and a Hendey lathe.

Another well-equipped machine shop is operated by M-K. Machines include a Lodge & Shipley 18-in. lathe, a tool grinder, radial drill, 80-ton press, drill press, valve refacer, spark plug cleaner and similar units.

Throughout the Seaway and Power Projects, maintenance headaches have been eased somewhat by the good service supplied by distributors and jobbers. Tires, for instance, are handled mostly by the big rubber companies on a contract basis. Brake rebuilding and generator repair is farmed out to firms with mobile shops. And equipment dealers have set up well stocked branch offices.

Maintenance supervision on the Seaway and Power Projects is the responsibility of Lin Arbogast for Kiewit, Richard Brown for Morrison-Knudsen, Leo Lifester for Walsh, Vic Pandolfi for Perini and Gail Wolf for Dutcher.

CANTILEVER BRACKET is welded to truck frame to act as anchor for slop-tight tailgate. Chain will connect it to upper arm that holds gate, a flat plate reinforced by angles.

LEVER ARM that carries tailgate is pinned to truck body. Gravity holds gate in place until truck dumps. Then chain between arm and bracket (photo above) keeps gate in roughly same position while body's front end rises and rear lip drops down from gate.

Results of 8 years' research on rubber-tired tractors

By J. R. Cianchette
General Contractor, Pittsfield, Maine

A number of contractors have asked me to tell them what I have learned in 8 years of study on the application of rubber-tired tractors to the problems of present-day earthmoving. I've tried to set down here, as best I can, a factual report of our experience in Maine with these relatively new type units. I'd like to comment, before I go into the history of our research, that ninety per cent of the work we do up here in Maine is rugged, tough work. I think from what I've seen, that conditions here are probably as tough, or tougher, than anywhere else in the country.

I started my research back in 1947 or '48 with the purchase of a C2 Tournadozer for leveling fill. At the time, I reasoned that sooner or later rubber was going to be the coming thing, and I wanted to see if this early Tournatractor was a good rig and whether it could do certain jobs better than crawlers. We tried it thoroughly, found it could do all these jobs. Then we traded it and bought two of the much-improved C Tournatractors in '55, two more in early '56. We now operate these four Tournatractors together with thirty crawler-tractors.

When we started out with the C2, I figured that high speeds on rubber might have more advantage on the fill than on our other assignments. I had a few doubts about the machine, especially its ability to do certain jobs, and the fill job looked to me like the best place to start. We tried it out there, leveling top-soil fill and then, by trial and error method, on a number of other jobs including pulling sheepsfoot rollers, pushing rubber-tired scrapers, towing scrapers, pulling out stuck trucks. We used it wherever we had tractor work requiring hauling or dozing over pavement, as well as on miscellaneous service jobs of all kinds where a considerable percentage of travel time was involved. We found Tournatractor was successful on every one of these jobs.

However, like every piece of equipment, this rubber-tired tractor had some limitations. For instance, on slippery mud, it will not do as good a job as a crawler-tractor. With plenty of crawlers on the job, we definitely try to keep Tournatractors out of the mud. I understand the new wide-base tires now available increase the traction ground contact of the tires by approximately one-fifth. This may be the answer to the mud problem . . . I don't know, we haven't had an opportunity to try these new type tires out as yet.

While Tournatractor will work effectively in rocky going, we try to keep it off "ledge" work because our sharp ledge rock tends to chew up our tires some. We think it's logical to apply crawlers there and save on our rubber. However, to come up with the final answer on this problem, one has to balance the lower cost of rubber replacement against the higher cost of track replacement, which I will discuss later.

Our most favorable application is leveling fill and pulling heavy compactors. This job involves a lot of movement, and the big tires are a definite help on compaction. In a fairly large area of dozing, say about 1,000 feet or so, a Tournatractor can probably take the place of three 128 hp crawler-tractors on dozing and leveling fill. Any assignment that calls for frequent movement from location to location is also an ideal one for Tournatractor. Any time a contractor has to move a crawler-tractor over any distance, it's costing him real money. Not only costing money because of the time

Leveling truck dump at Loring Base.

Contractor J. B. Cianchette is probably the largest contractor north of Boston and definitely the biggest in the State of Maine. He has a large fleet of equipment including 4 Tournatractors, 30 crawler-tractors, 9 rubber-tired prime-mover-scrapers, 18 power shovels, 45 10-yard dump trucks. He handles jobs ranging from $300,000 to $10,000,000 in size ... has been currently handling about $3,000,000 volume per year.

that it takes and the production he loses, but also because of the track wear and replacement costs.

Frankly, we are still finding new uses for Tournatractor where it does the job better, faster, and at lower cost. For instance, just recently, we employed Tournatractor on our crushed stone piles. We were surprised at the ease with which this machine handled the work. We had always used crawlers on stockpile work, and figured they were the right tool for the job. But, based on performance and cost, it's definitely a Tournatractor job with us from now on.

Now regarding ownership and operating costs on Tournatractor as compared with crawlers — we analyzed these costs for comparative machines for one season and found our cost for operating the Tournatractor was about 50% of our operating cost for the crawler. We found major repair jobs were a very small percentage of the service work to be done on Tournatractor. We also found that the time necessary to repair and service is only one-tenth as much as the time on a crawler-tractor. About the largest repair item on Tournatractor is recapping of tires when necessary. One of our machines at Limestone has 4,000 hours on the original tires and our men there figure these tires will last out the summer for a total of around 5,000 hours. Then they plan to recap for less than one-half the cost of a new set of tires and that recapping will last another 2,500 hours.

Our costs for labor and materials in replacing a set of tracks on a D8, HD20 or TD 24 is about $6,500. In our rough working conditions, we have to be prepared to face this cost nearly every season. Sometimes we can get by for two seasons with a minor repair job. A complete set of new tires for one of our Tournatractors costs only about $3,000 and, so far, our experience indicates these machines will work two seasons on the originals, plus one more season on a recap job.

Our present-day Tournatractors are just about 100% available for work all through the season. The only problem we've had on the two machines that are on their second year of service was a brake replacement job at the end of last season's work. From experience on our four '55 and '56 machines, I feel they are perfectly sound mechanically. We have had no problems and very little maintenance on them. They are a big improvement over the first C2 machine we bought 8 years ago.

We have had some operator problems in bringing in Tournatractors as a part of our tractor fleet. Obviously, since we try to use these high-speed machines whenever we have hit-and-run or emergency jobs, we'd like to have our best operators on them, especially dependable men with initiative who can be counted on to do a good job on a one-man operation with minimum supervision. Also we try to pick men who will like the variety ... and who will enjoy using Tournatractor's speed and yet be safe operators.

We find that operators transferred to Tournatractors, at first think it is an "awkward" machine. After awhile, they get to like it, and eventually like it much better than the crawler-tractors. We find it's about a 50-50 proposition training a crawler operator to do a good job on Tournatractor, or training a good truck driver or other likely applicant with no previous tractor experience. Obviously some crawler operators are too set in their ways to make the transfer to Tournatractor. Some operators like a repetitive job where you do exactly the same thing in practically the same way hour after hour, and day after day. Even if you have Tournatractor on the same kind of repetitive job, this chap isn't likely to take to the changes involved in using the new type tool to advantage. In other words, some crawler operators are too set in their ways to make it worth while to try to get them to operate Tournatractor.

Continued on next page . . .

Spreading gravel base for a parking lot at Loring Base is a high-speed operation for Tournatractor. Excellent blade control leaves little for the finishing crew to do.

Contractor Cianchette's report

(continued)

Perhaps you will be interested in a brief summary of where and how we are using Tournatractors today on our current jobs.

At Loring Air Force Base at Limestone, Maine, we are working on a contract to lengthen runways and taxiways, put in streets, parking areas and miscellaneous roads. On this project, which is now nearing completion, we have used two of our Tournatractors for backfilling ditches, leveling gravel on roads, leveling parking areas, stripping dirt to open a new gravel pit, leveling loam on landscaped areas, working over blacktop on backfilling operations. We've also used them on all sorts of regular tractor work.

Here is an example of Tournatractor's travel advantage as shown at Loring. We had a Tournatractor working leveling out truck-dumped material for a parking lot. When this job was finished, we wanted to move the tractor to another leveling location about a half-mile away. The Tournatractor took off and drove right over black-topped streets to the new location in five minutes time. Valier "Frenchy" Theriault, who supervises our Tournatractor operations, tells me it would have taken a crawler-tractor at least two hours to make the same move. If he called up a flat-bed for moving the crawler over the blacktop, he would have had delay waiting, loading, and unloading on top of hauling time and expense. Two hours would be a conservative estimate for that type of operation. If they moved the crawler under its own power, they would have had to manhandle planking cover for the blacktop all the way and would need a hand-labor crew to do it. Again he'd need at least two hours to make the move.

Landscaping is faster with Tournatractor. Compaction by tires builds a more stable base for lawns and shrubbery. Operator Carroll Bragdon likes his job. He tells me he can get around a lot quicker on Tournatractor than a crawler. Says they're a lot easier to operate.

Valier "Frenchy" Theriault, who is our Special Supervisor of Tournatractor Operation says: "Tournatractors ride good. They're not as hard on a man as a crawler. They handle easy, and you can do a lot of work with them if you use them right. They're easy to work on . . . easy to lube and maintain. Our operators take about ½ hour in the morning to check out the machine. We're particular about preventative maintenance. In the cab of every tractor we keep a sticker that lists the hour-meter reading, last oil change, filter change, etc. Our oil company supplies them . . . they are just like the ones they use to check your car service."

One of the biggest values of Tournatractor is this opportunity for quick moves from one operation to another. I can't see how any contractor can get along without at least one of these highly mobile Tournatractors on each of his operating spreads.

At Dow Air Force Base near Bangor, Maine, we are building a new 13,500-foot runway. This runway has a foundation going down 5½ feet and will have a 50-inch base of gravel topped with 6 inches of crushed rock and sealed with a heavy blacktop paving. Runway is 300 feet wide with a 200-foot shoulder on each side. Few runways are larger than this one at Dow and, in Maine, only the one at Limestone is the same length. At this Dow Base, in addition to our runway contract, we have a contract for the utilities on the base proper. We have already removed half a million yards of rock and are employing around 600 men on the runway construction alone.

We are using two Tournatractors on this job. At present, one is being used with a big sheepsfoot roller to compact fill in the runway area. This material is soft and spongy . . . difficult to pull a roller through. But Tournatractor does a good job here. Its rubber tires help with the compaction and every so often operator uses his dozer blade effectively to level the compaction area.

At Loring Base at Limestone we've pulled a special 150-ton compactor used on the big runways with a Tournatractor. It rolled it right along without any trouble.

A few days ago we borrowed one of the Dow Base Tournatractors to pull a Cat 70 Scraper and it did a fine job. We don't use Tournatractors on scrapers very often because we have plenty of high-speed, rubber-tired prime-mover-scrapers for this work.

Our second Tournatractor at Dow is used in the quarry-stone stockpile areas. We run our own quarry right near the job and use this stone for topping our gravel and to make our blacktop mix. Tournatractor keeps the stone stockpiles in shape and also concentrates stone to feed the clamshell that feeds the blacktop plant. We also use part of its time at our sand and rock stockpiles at the concrete plant we are building some distance away. In addition, we chase it into the pit whenever we need clean-up at the Northwest shovel that is loading stone into trucks for hauling to the crusher.

Both of the Dow Tournatractors have also been used to level and spread truck and scraper dumped material, for pusher service, and to do a dozen other kinds of tractor work whenever we needed a fast lift.

All of our rubber-tired equipment, including Tournatractor, has drive tires hydroflated to 75% of volume with a calcium chloride solution. We set the air pressure on Tournatractors at 30 pounds and let it go at that. We don't vary pressure for varying materials nor do we have a frequent checking schedule as we find operators can visually notice any material change in pressure. When we have an oil change or other shop service we, of course, check the tires to be sure pressure is holding up. Really, we haven't found tire service much of a problem. It's much simpler and takes less time and less supervision than our service on tracks.

I'd like to add that we're very particular about preventative maintenance. That applies to Tournatractors and to all our other equipment, too. Maybe that's one reason we've had such good luck with Tournatractors. I think you have to face the fact that this is a precision-built, anti-friction machine — larger perhaps, but comparable in construction and service requirements to a good truck or good automobile. If you put a good operator on it who will work with it and take advantage of its superior speed and mobility, it will make good money for you on just about any assignment. If you are going to put a poor operator on it, don't buy it . . . he'll do better on a crawler.

Cleaning up stockpiles at Dow Base quarry is just one of this Tournatractor's many jobs.

Another assignment is feeding quarry clamshell from stockpile at Dow Air Force Base near Bangor.

Big loads come over the top of the crushed stone stockpile to feed quarry clamshell.

When stockpile work is caught up, Tournatractor cleans-up around shovel on quarry floor.

This quarry-service tractor also runs to clean-up odd jobs whenever emergency help is needed anywhere else on the Dow Base Project.

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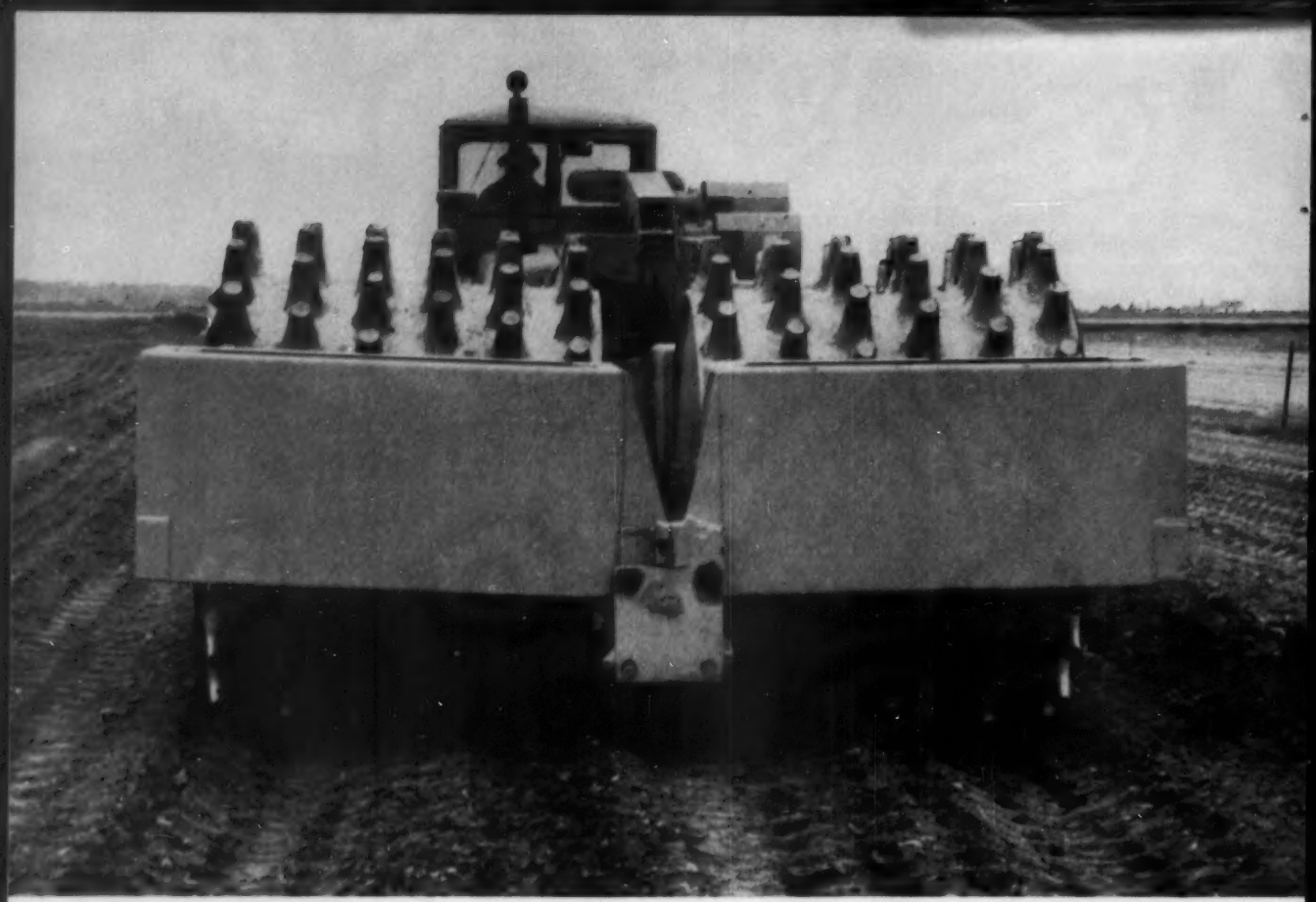


Tournatractor pulls LeTourneau-Westinghouse sheepsfoot roller as it picks 'em up and lays 'em down on our contract at Dow Base.

Contractor Cianchette's report

(continued)

To make the most out of Tournatractor, pick out the assignments where speed and mobility are of prime importance. It can make a *lot* of money for you there. Operating cost, with any reasonable service, should, based on our experience, be lower than on a crawler. Materially lower if you translate your figures to a *per-mile* basis. Non-productive time is less. First cost, currently, seems to be around 10% less than crawlers with the same horsepower and with torque converters. These are standard equipment on Tournatractor, extras on the crawlers.

Today, I think we can use Tournatractor on 95% of our tractor work. That is, there is only 5% that Tournatractor isn't physically able to handle. On at least a third of our work, I think Tournatractor will beat crawler costs. On another third, it's probably close to neck and neck. On the remaining third, the crawler will win in cost on the basis of today's machines. Included in this crawler third, there is only a very small percentage where Tournatractor either couldn't do the job at all, or where unit production costs would be enough higher to make its application impractical.

Taking all these things into consideration, if I were setting up a new fleet of equipment for Maine work, I'd buy one Tournatractor for each three crawler-tractors and then check for results. I'm planning to convert my present fleet on about that basis as I make replacements. This is for Maine. In most other areas, where there isn't so much rock and so much rough country, I think I'd like to have a fifty-fifty tractor fleet, half on crawlers and half on rubber.

Frankly, I can't understand how any contractor can afford to operate jobs of any size without at least one or two Tournatractors. At the time we started in business, we could probably have used a machine like the early Tournadozer, on only about 50% of our work (on the basis of ability to do the work but without regard to cost). Times have *changed* in the last 10 years, job conditions have improved, and equipment has improved. All this calls for new thinking and study of what LeTourneau-Westinghouse calls "The New Dimensions of Earthmoving", especially those of speed and mobility.

Ten years of trends proves definitely that the entire dirtmoving industry is going to rubber. It is logical and important that a tractor be on rubber — probably more important than on any other machine — because by nature a tractor is a *moving* machine.

It seems to me only reasonable that any dirtmover, seeing this trend, should start now: moving in some tractors on rubber, fitting them in on

Here Tournatractor levels ahead of compaction sheepsfoot at Dow Base. Its big rubber tires provide 20-ton compaction in tire tracks and, by making passes to lay down these tracks side by side, helps cut time needed to meet compaction specifications.

Tournatractor travels cross-country or via paved highway at speeds to 17 mph. This half-mile move took 5 minutes. With either planked pavement-cover, or low-bay trailer haul, crawler would have used 2 hours for same move.

the most likely spots, and checking, as we have, how to get the most out of them...where best to apply them, and how to select and train operators and foremen for their most successful use. It takes some changes in habits that are hard to break. You have a new and important "plus" in speed and mobility, but both you and your men will have to learn to use these characteristics effectively if you are to profit by them.

I hope this discussion of our experience has been helpful. If you would like to have extra copies of my report for discussion by your staff, I am sure LeTourneau-Westinghouse Company, Peoria, Illinois, will be glad to mail you any number on request. Or your local LeTourneau-Westinghouse Distributor can supply them for you.

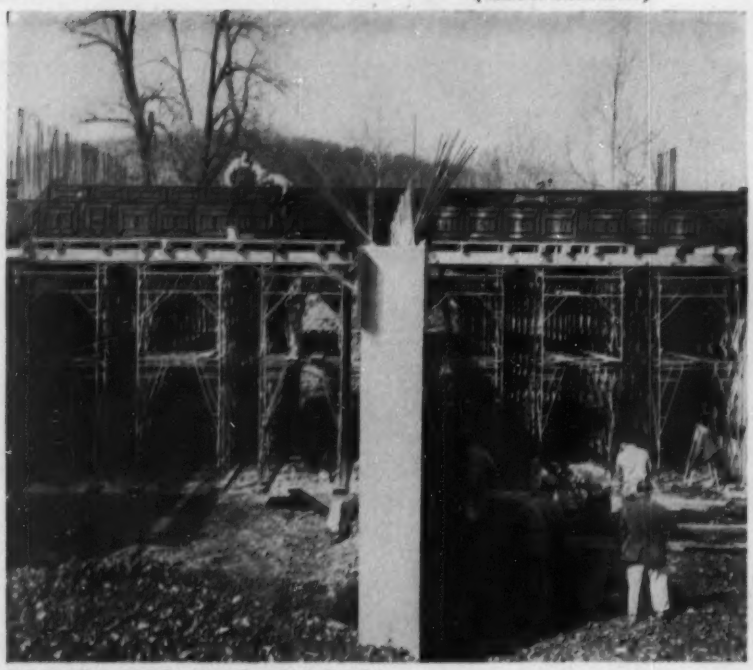
J. R. Bianchette
General Contractor

Mr. Cianchette's report on his 8 years of research on rubber-tired tractors is published for your information by

LeTourneau-WESTINGHOUSE Company, Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

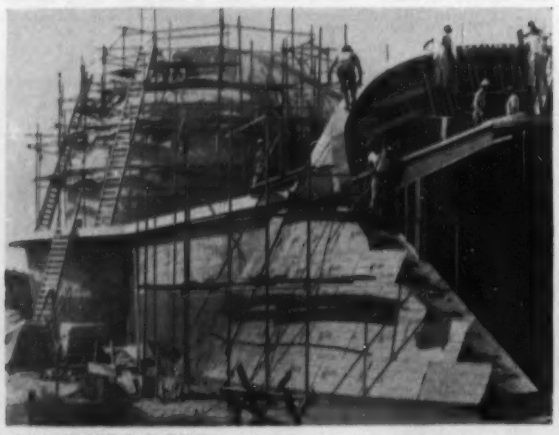
(Advertisement)



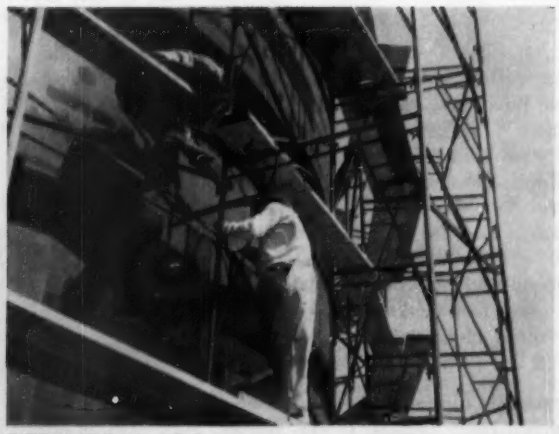
BRIDGE SHORING CUT 25% — Modern "Trouble Saver" ® Steel Shoring helps contractor, Mal-Bros., save 25% in shoring costs, over wood methods, on a street relocation job in Scotch Plains, N.J. 272 frames with patented SlideLoks, quickly assembled in 3' x 5' towers and 2'6" between rows, provide support for the new roadbed. The contractor says his savings would have been 50% if the job were bigger.

LEVELING OFF — Masons for contractor John B. Kelly easily check level from safe, stable 28" wide "Gold Medal" ® Twin Drum Scaffolds on the new 14-story Virginia State Office Bldg., Richmond.

Scaffolding Methods . . . by Patent Scaffolding Co.



ALL SURFACES — Plasterers for Travis and Rodgers, contractor, get everywhere quickly on these 40' by 36'-high odd-shaped domes from 2½ miles of "TubeLox" ® Scaffolding. Cantilevering prevents the scaffolding from bearing at any point on this building in Disneyland near Los Angeles.



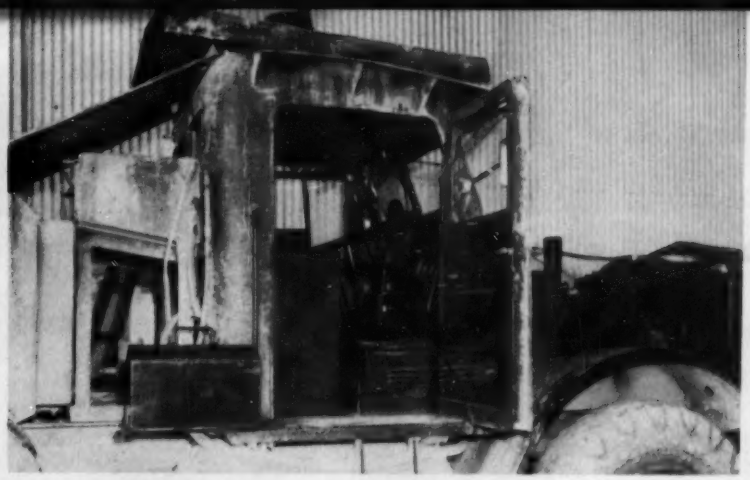
REFINERY JOB — "Trouble Saver" Sectional Steel Scaffolding is easily assembled to conform to round surfaces, such as this oil storage tank at the huge new Tidewater Oil Co. Delaware Flying-A Refinery near Wilmington. Workmen for C. F. Braun & Co., builder, are insulating the tank's exterior.

To help you with your scaffolding methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

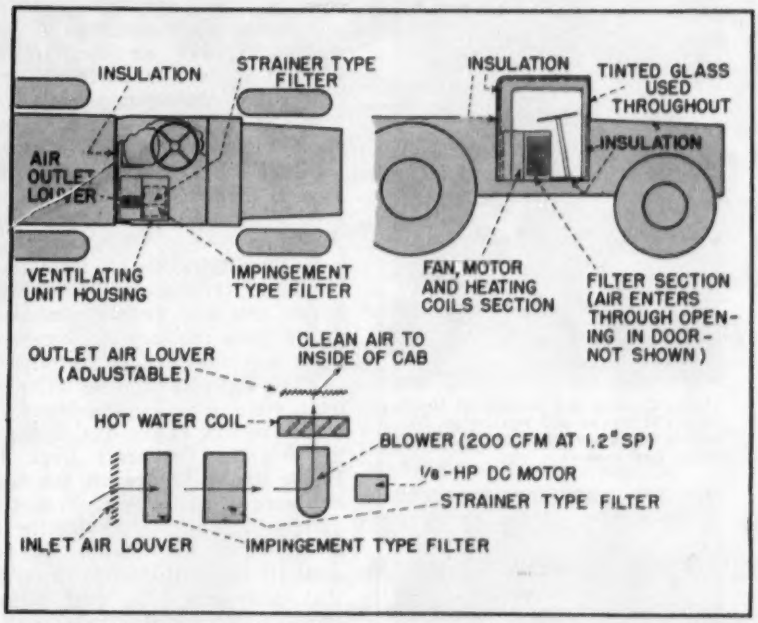
38-21 12th Street Dept. CM&E Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
Branches in all principal cities
In Canada: 355 Dufferin St., Toronto



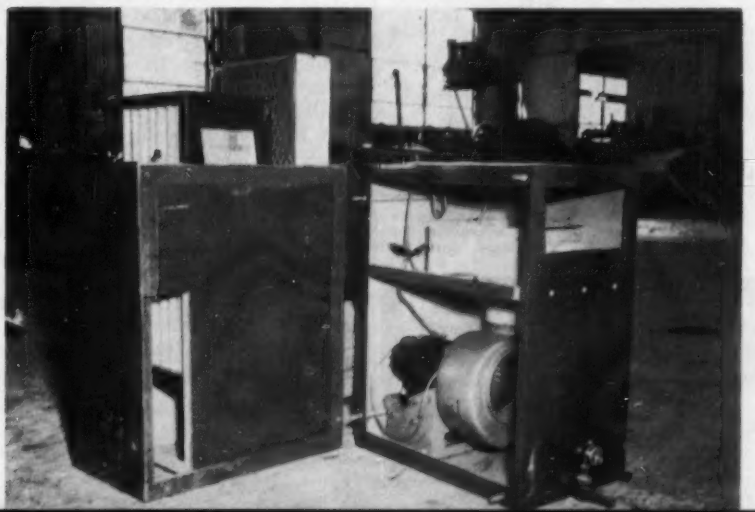
TRUCK'S EXTERIOR is coated with dust, but ventilating unit mounted next to driver's seat keeps cab clean and cool. On big rigs, air in the cab is changed five times per min.

MAINTENANCE is simple because filters can be changed easily from cab-mounted housing.

Air Cooled Cabs Beat the Heat



VENTILATING SYSTEM consists of blower, two-stage air filtering system, and independent power source to drive fan. Inlet air louver is located at the rear of the cab, top left, or in the door, top right. The compact ventilating unit, below, also heats cab in winter.



EARTHMOVING EQUIPMENT operators working a hot and dusty California strip mine are pushing their rigs from clean, comfortably cool cabs. Johns-Manville Corp., owners and operators of the open pit mine, recently air conditioned 21 of its machines, including bottom dumps, tractors, and big shovels.

The specially designed ventilating systems, which cool the cabs with frequent air changes instead of with a refrigeration unit, "have added materially to the morale, health, safety, comfort, and performance of our operators," according to G. G. Schuknecht, assistant manager of the Lompoc operation.

The ventilating systems are installed on 10 Euclid bottom dumps, five Caterpillar D8 tractors, two Caterpillar No. 12 road graders, two P & H shovels, a Euclid loader, and a Koehring 304 truck crane. Total cost was $51,682, or an average of $2,461 per rig. This seems expensive, but it includes the cost of several years of experimentation and development of the units.

Units Not Available

Experimentation was necessary because Johns-Manville was not able to find a suitable ventilating system on the market. J-M engineers experimented with a heavy-duty system offered by one equipment manufacturer and consulted 25 others without finding a unit that suited their needs.

Finally, a system designed in association with Kilpatrick Co. of Al-

(Continued on next page)

AIR-COOLED RIGS . . .
continued

hambra, Cal., was chosen as the best. This system consists of the following:

• Trucks and tractors are equipped with Buffalo Size C baby ventilation blowers that deliver 200 cfm. Larger units, such as the P&H shovels, get blowers that supply up to 2,000 cfm. In both cases the blowers are driven by Pierson-Frame No. 13, ⅛-hp, 1,750-rpm, 6-v dc motors.

• Independent power to drive the ventilating fans is provided by heavy-duty Delco-Remy 50-amp, 6-v, dc generators which are powered with 200-amp-hr batteries.

• Filtering is accomplished in two stages. Primary air cleaning is through a 12x24-in. surface wire-type filter impregnated with BA Viscosine oil. The secondary air cleaner is a 12x24-in. surface paper-type filter that uses 10-ply, Type S Airmat paper. Both filters are manufactured by the American Air Filter Co.

• A 1-in. thickness of insulation is placed throughout the tightly sealed cab and thermal resistant safety glass replaces the standard glass in windshields and windows.

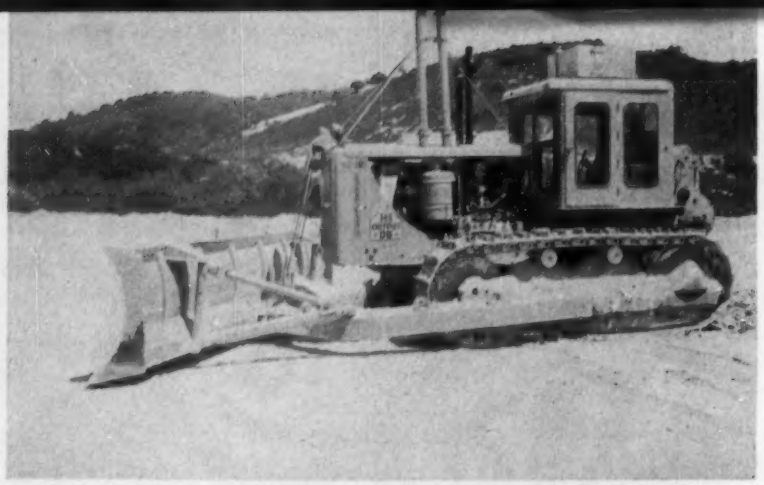
When considering installation of ventilating units, Johns-Manville asked the U.S. Public Health Service and the California Dept. of Public Health to measure the dust exposure in the cabs of its earth-moving equipment. Diatomite is stripped from the Lompoc open pit mine. It is a soft, friable material that splits into a fine dust during the stripping and quarrying.

Government tests showed that the dust count in 95% of the cases was above 5 mppcf (million particles per cu ft), the maximum allowable dust count, according to Johns-Manville. In some cases, the dust count in the cabs registered 110 mppcf, or 22 times the amount of dust considered tolerable.

When choosing the ventilating system, the main problems were to keep the unit compact enough to fit easily into the limited area of a cab and to make the unit tough enough to stand up under the rigors of earthmoving operations without frequent maintenance.

At first, J-M engineers believed

(Continued on page 114)



RIGS VENTILATED include Caterpillar D8's, shovels, bottom dumps, road graders, loader and truck crane. Average cost for each rig is $2,461. Installation takes 80 hr.

SAWING or FINISHING Concrete

It's all in the day's work for **WISCONSIN-POWERED** *equipment*

Clipper Concrete Saw working on Lincoln Memorial Bridge job, Washington, D.C., holding cutting depth to 3" to avoid cutting bridge steel beams.

If the job calls for cutting contraction joints instead of hand forming; trimming completely through 4½" slab; breaking up concrete for replacement or handling a variety of cutting operations . . . Wisconsin-powered CLIPPER Concrete Saws, made by Clipper Mfg. Co., Kansas City, Mo., will slice through limestone concrete at a rate of 10 ft. per minute . . . or 12 ft. per minute through asphalt.

On the other hand, if the job calls for smooth finishing of concrete surfaces, a unit such as the Superior Power Trowel, made by Superior Cement Tool Corporation, of Lynwood, Calif., will handle the assignment with speed and efficiency.

Wherever there's a tough, rugged job to be done, you can depend on Wisconsin heavy-duty construction and foolproof AIR-COOLING at all operating temperatures from low sub-zero to 140° F. to get the job done on schedule. Wisconsin Engines are built to "take it" and keep on coming back for more of the same.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for "Spec" Bulletin S-188.

Superior Power Trowel, powered by Wisconsin Engine because "it was the only engine combining light weight plus hp. — a big factor in power trowel design."

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

Clipper® MASONRY SAW

"SAWS RIGHT THRU"

The SAW That *Cuts Faster – SMOOTHER – Makes Blades LAST LONGER!*

Cut in 5 Seconds with CLIPPER

...and Only Clipper Patented Features assure this performance

MODEL HD
Wet or Dry Cutting Dustless.
A Model to fit every budget,
Priced from **$265**

Not Just a NOTCH
A Deep Seating NOTCH!

SELECT-A-NOTCH (patented). It's easy for one man to adjust cutting head —to desired height for cutting any size material. Weight of head is supported by connecting bar. Clipper's deep seating notches always guarantee true cutting head alignment—assure maximum blade life and increased production.

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- ☐ I want a Clipper Masonry Saw on FREE TRIAL.
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- ☐ Have a Clipper factory trained representative call on me.

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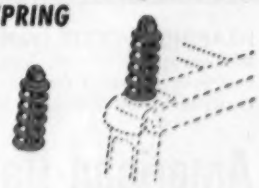
MAIL COUPON TODAY!

FREE TRIAL

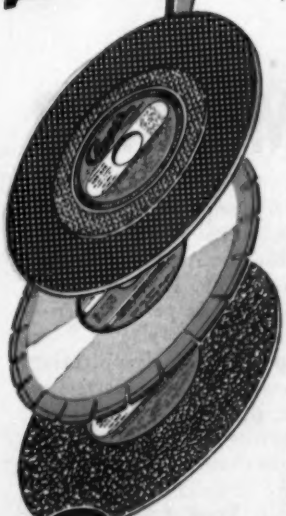
You be the judge—try this new Clipper FREE on your job. The outstanding policy of Free Trial has been in effect since Clipper invented the World's First Masonry Saw nearly 20 years ago.

Not Just a SPRING
A Pressure Equalizer SPRING



Makes your blades last longer . . . because Equalizer Spring automatically cushions blade pressure, whether cutting hard or soft materials. Guarantees faster cutting — with longest blade life.

CLIPPER BLADES



BREAK RESISTANT

Triple Reinforced . . . in specifications to cut every masonry material . . . HARD to SOFT. Another Clipper First! Polk-A-Dot design reduces side friction, delivers maximum power to cutting edge. Break-Resistant—Safer—Lower Cost.

DIAMOND

Clipper sells more because Clipper sells Quality. Blade after blade, on tile to block, Clipper Diamond Blades outperform, outcut and outlast any other blade. Dependable . . . consistent quality.

ABRASIVES, Wet or Dry

Hard . . . Soft . . . Porous . . . Dense, Wet or Dry there's a special Clipper Abrasive Blade to cut any masonry material faster, better with guaranteed lower costs. Clipper quality is your Best Buy.

CLIPPER IS *CONVERTIBLE*

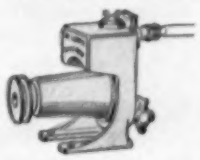
LIGHT DUTY CONCRETE SAW

Cut Machinery Bases, Repair patch walks and driveways

TRACK SAWS

Cut Transite Sheets, Stone and Refractory Slabs and Other Large Materials.

Not Just a PUMP
A WET or DRY PUMP



Clipper's Sealed Water Pump needs no extra motor—no electrical connections. Permanently attached to eliminate pilferage. Always adequate water to preserve blade life—control DUST. Never too much to soak material or drown operator. Just turn valve—no need to remove belt when cutting dry.

Clipper® MANUFACTURING CO., KANSAS CITY 8, MO.
Sold Only Direct by Factory Trained Representatives
From Factory Branches in Principal Cities—Coast to Coast.

HEAPING BUCKETS SWING UP, OUT of a sewer trench without spill. To reach down to 23 feet, the operator first stripped off 2 to 3 feet of top soil to the width of the crawlers—then came back to trench down to grade using the American Backhoe's full 20′ 5″ depth reach. Even when working way down to full reach, and dumping from a 45° swing, the machine maintained a cycling pace that satisfied the contractor's demand for fast excavation!

American Backhoe's Speed Key Factor As . . .

SHORING IS VIRTUALLY ELIMINATED

By working fast, before crumbly clay soil could dry out and threaten to cave in, a sewer trenching and pipe laying job was done with a minimum of time consuming shoring! The job, in New Ulm, Minnesota, consisted of a 1500-foot main sewer trunk plus service stubs into residential lots. Trench depths ranged down to 23 feet. Contractor Eric J. W. Johnson used his American 200 Backhoe with ¾ yd. bucket for the job because it was the only machine in his fleet fast enough to stay ahead of a top-notch pipe laying crew. In addition, the smooth action of the 200 Series didn't shake the ground enough to cause cave-ins.

Johnson, 40 years in the excavating and earth-moving business, reports that his American 200 Series hoe has plenty of "guts"—results in bigger bites and faster cycling. He says, "I really like the American—it'll go! A full bucket comes up just as fast as an empty one!" He adds, "Everything on the American works together—that's what counts!" It's true, everything does work together because American Cranes are designed from the ground up. Perfect match, precise balance, results in effortless performance—top production and fast cycling!

Fuel, filters and wire rope are the only operating expenses recorded by Johnson, who headquarters in Gibbon, Minnesota. About the rope Johnson says, "If a man isn't wearing out rope, he isn't working!"

In New Ulm, and across the country, owners report outstanding job performance at amazingly low operating and maintenance cost. Your American Distributor has the complete story—the why and how of American Crane design. Investigate American's complete line of tough, efficient truck and crawler cranes in capacities from ½-yard, 12½-tons on up!

(Advertisement)

"YOU GET A FULL BUCKET EVERY TIME and the American's easier work for the operator," reports Chell Johnson, crane operator on the New Ulm job. "The brakes are easy on the legs—visibility is good and it's easy to lubricate. I'm impressed with its roominess—everything about this American Crane suits me," he concluded. You'll find that reliable, cooler running American clutches stay even and smooth on tough, fast cycling jobs. Minimum slip and minimum adjustment keep Americans on the job longer!

NO EXTRA EXPENSE TO DATE—that's the report of Paul C. Gresl, Appleton, Wisconsin, excavating contractor whose American 100 Series Backhoe, rated at ½ yard, was used on a 6700-foot storm sewer project. "We've moved an average of 500 cu. yds. every six hours with our American," Gresl says. "So far we haven't had any trouble—the machine has done more than we ever expected it to do and we're very pleased with it. Another contractor in Appleton bought one of the Americans after he had seen ours working," Gresl added. Here's why American Cranes operate longer without expensive repairs: Job proved design combined with rugged construction reduces stresses and strains, cuts downtime to the bone. Easily accessible fittings assure frequent, thorough lubrication that reduces wear. And the wide-open machinery deck layout makes inspection and adjustment a simple job that keeps the machine in peak operating condition!

ON THE SEAWAY, THE NUMBER ONE "BIG CRANE" is the giant American Revolver Crane. From the design and manufacture of these huge machines, American Hoist engineers gain invaluable knowledge about the fundamental requirements of efficient crane operation. The same big crane knowhow is engineered into American Truck and Crawler Cranes. That's why you actually get big crane performance from every American—from ½-yard on up!

"There's an American Crane for every job!" That's a statement proved day after day on tough jobs everywhere. American versatility stems from a complete selection of fronts—a complete range of sizes to do *any job!* If you're quarrying rock or handling gravel—digging trenches or excavating—pouring concrete or setting steel, you'll find an American Crane in just the right size for your job! Your nearby American Distributor knows all about this great line of rubber and crawler mounted cranes. See him soon!

AMERICAN HOIST

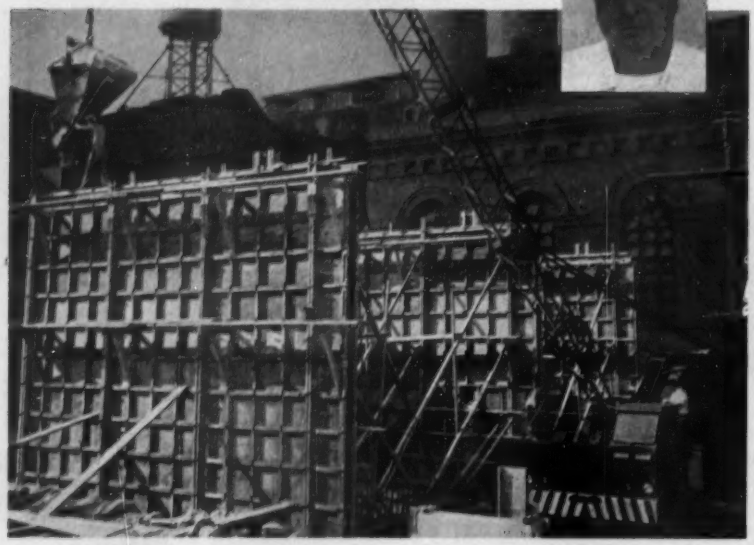
and Derrick Company

St. Paul 1, Minnesota

(Advertisement)

"The industry has needed an on-the-job form assembly system like this for a long time."

Lawrence H. Johnston, Form Construction Superintendent; Rosoff Bros., Inc. and Amdor Structures, Inc.



Major Concreting Economies Laid to New Richmond Forming Method

"Everything goes faster—setting the forms, pouring, taking the forms down. No doubt about it, the new Richmond Snap-Ty Form System is the modern way to form and pour."

Mr. Johnston has used this prefabricated panel system on several Rosoff-Amdor projects . . . started as soon as Richmond introduced its new booklet of modular panel forms and made available hardware for putting together prefabricated panels easily—right on the job.

Rosoff-Amdor builds the panels on the job—uses them over and over again. For this job, they stacked them horizontally, used the walers vertically. For walls under 15 feet, they use 3,000-lb. Richmond Snap-Tys; for the high walls, 5,000-lb. Snap-Tys. They pour 26-foot-high walls like these in a single day in one continuous pour.

For erection of light foundation wall forms, Richmond Snap-Tys and accessories give you worthwhile savings all along the line. Head washers of Snap-Tys are made of special-strength steel securely held by a clean, well-formed upset at each end to give positive bearing to the Tyholder. This transmits the full strength of the Snap-Ty to the walers and prevents costly form breaks. Break points are set back from the wall face. This permits clean, easy stripping and prevents spalling of the concrete.

SNAP-TY AND TYHOLDER
2 sizes: 3,000 lbs. and 5,000 lbs. safe load

You, too, can benefit by using this fast, easy method for erecting light foundation walls. See for yourself. Send for your copy of the new Richmond Snap-Ty Form Book containing complete diagrams and forming data. It's free for the asking.

Richmond does not make, rent or sell forms. Richmond sells form-tys and accessories only. The free 20-page booklet tells you how to make and assemble your own forms that can be used over and over. Send for it. Ask, too, for your copy of the new Richmond Handbook, which describes the full line of Richmond-engineered tying devices and accessories. Write to: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 South Fourth St., Saint Joseph, Mo.

Some of the new accessories developed by Richmond for easy on-the-job assembly of prefabricated modular form panels.

AIR-COOLED RIGS . . .

continued from page 110

refrigeration would have to be included to keep the tightly-sealed cabs cool enough for the operator. This would have increased both the size and the cost of the unit.

Instead of including a refrigerating unit, however, the engineers found that if they were able to generate constant air movement in the cab, it remained comfortable even on the warmest days. The ventilating units finally decided upon provide from one to five complete air changes per min, depending upon the size of the cab and working conditions. This frequent air change, plus a louvered directional control for the fresh air outlet, allows the operator to adjust the flow of air as conditions dictate.

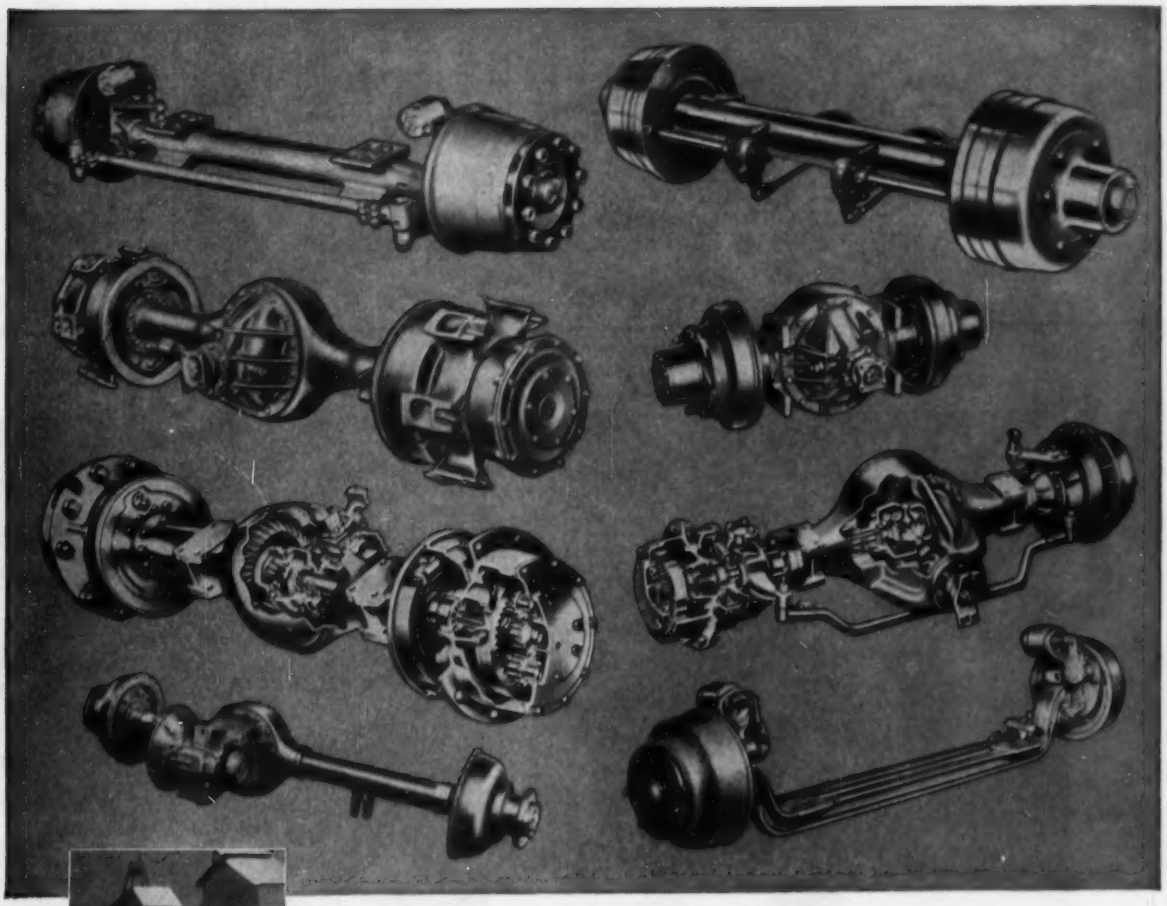
It is important that the cabs be kept as clean as possible. For this reason, the men frequently sweep out the floorboards and are careful not to introduce dirt on their shoes. When in operation, the cab must be sealed as tight as possible. So that outside dust does not enter the cab through leaks around doors, windows or floorboards, filtered air is supplied with a slight positive pressure inside the cab (about 1/16-in., water gage).

Johns-Manville has equipped a service trailer with dust-tight compartments for transporting spare filters and supplies to units in the field. The trailer also carries a powerful vacuum cleaner so that the service man can clean the inside of the cab at the same time the filter is being changed.

Each ventilated rig is serviced about every 8 hr, usually at the lunch hour so that no production time is lost. When filters are dirty, they are changed in the field and brought back to the shop where they are steam cleaned, oil dipped, and equipped with new filter cloths or papers.

Maintenance and upkeep of the 21 ventilated units averages about 1.2 man-hr per month for each piece of equipment, according to Schuknecht. Total cost for labor and supplies is $27.80 per unit, per month. Approximately 80 man-hr are required to modify a cab and install a ventilating system.

According to Schuknecht, results have exceeded expectations. Accidents are less frequent because visibility has improved, eye injuries from dust now are rare, and production has increased. And, of course, operator morale never has been higher.



A flattering thing to say for *any* working vehicle

CLARK AXLES!

Champions, they say—athletes or revenue vehicles—are as young as their legs; which explains quickly why Clark-equipped vehicles grow old profitably——their "legs" stay young.

Clark builds axles for every type of commercial vehicle

- *trucks and buses*—rugged, easy-to-steer front axles; driving axles, steering and non-steering
- *trailers*—light, rigid, tough axles of high carbon steel tubing; spindles forged integral
- *off-highway vehicles*—specially designed heavy-duty drive axles, steering and non-steering, for industrial machines; axle-transmission drive units for agricultural and industrial applications
- *fork-lift trucks*—axles designed for materials handling equipment
- *housing*—light, exceedingly strong, one-piece forging, heat-treated

What is your need in that vital area of "durable legs?" In Clark axles you get the solid cash benefits of 50 years concentration on transmitting horsepower to wheels: efficiently, economically, durably.

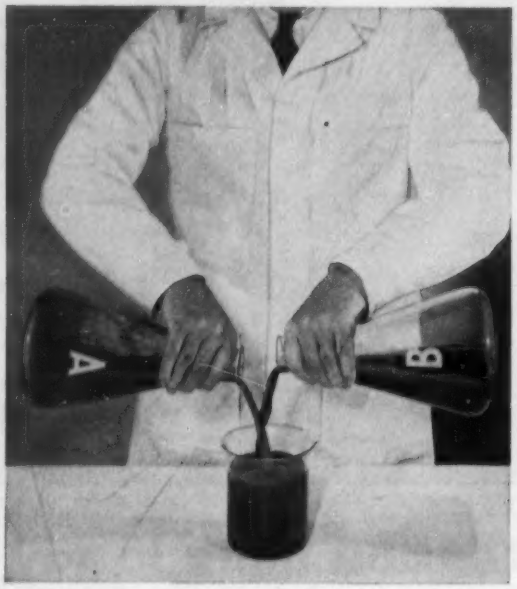
CLARK® EQUIPMENT

A handy-sized Clark Products book is yours on request; indicates several reasons why leading manufacturers find it **good business to do business with CLARK.**

CLARK EQUIPMENT COMPANY, Buchanan 6, Michigan

OTHER PRODUCTS OF THE CLARK AUTOMOTIVE DIVISION—
TRANSMISSIONS • AXLE HOUSINGS • TRACTOR UNITS • TORCON TORQUE CONVERTERS
ELECTRIC STEEL CASTINGS • GEARS and FORGINGS • FRONT and REAR AXLES for TRUCKS, BUSES and OFF-HIGHWAY EQUIPMENT.

How the Du Pont Anti- save you work,

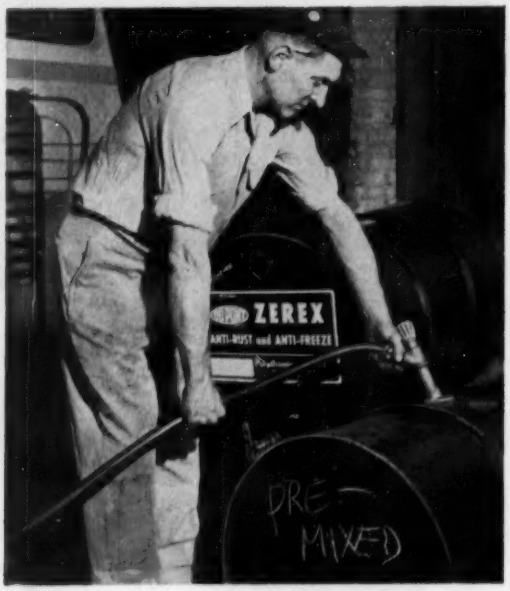


1. Pick the best!

Photograph above shows why your costly equipment is safest when you winterize with Du Pont Zerone® or Zerex® anti-freeze.

Flask "A" contains a solution of ordinary anti-freeze with an oil inhibitor. Flask "B" contains a solution of "Zerex" with Du Pont's exclusive chemical inhibitor. To each was added the same amount of ground rust. Flasks were shaken and contents poured. Notice how film of rust clings to the inside of Flask "A" just as it would to cooling system. But Flask "B" with "Zerex" is clean—rust particles stayed in suspension—drained out with the solution. Du Pont's chemical inhibitor will never form an oily film of rusty sludge that could clog radiators, causing overheating and serious engine damage.

This is just one of the many advantages you get when you protect your equipment from freeze-ups, rust and corrosion with either "Zerone" or "Zerex" anti-freeze. Pick the Du Pont anti-freeze best suited to your needs and you have taken the first step in the anti-freeze preventive maintenance plan—that will save you work, time and money.



2. Pre-mix your anti-freeze

Both "Zerone" and "Zerex" will mix completely in water, and the rust inhibitor will not separate from the solution while standing. This permits you to pre-mix your anti-freeze solution to any degree of protection desired for use when and where you need it.

Stock your pre-mixed anti-freeze in any convenient place. It will keep indefinitely — always ready to use.

When anti-freeze is pre-mixed, installations can be made rapidly by unskilled help and without the need for individual time-consuming hydrometer checks. What's more, guesswork and the chance of costly overprotection are avoided — and pilferage problems are discouraged.

Take advantage of the total savings possible when you pre-mix with Du Pont "Zerone" or "Zerex" — the quality anti-freezes that can be pre-mixed with water to stay!

Freeze PM Plan can time and money!

PREVENTIVE MAINTENANCE

3. Use the "Zerex" Test Kit

Thousands of dollars' worth of equipment is ruined each year because winter-worn anti-freeze is left in the cooling system to turn acid and cause rust and corrosion.

Now for the first time Du Pont makes it possible for you to tell – right on the job – which "Zerex" anti-freeze solutions are safe to re-use and which are worn out and should be replaced with a fresh "Zerex" solution. In this way, you can reduce cooling system maintenance expense and cut your "Zerex" anti-freeze costs in half!

And remember, *only* "Zerex" anti-freeze can be safely analyzed – on the job – with the exclusive "Zerex" Anti-Freeze Test Kit. This new method for testing reserve alkalinity in "Zerex" anti-freeze is a development of Du Pont research. It helps make possible an anti-freeze preventive maintenance plan that will save you anti-freeze and cut your operating costs.

Your best anti-freeze buy!

Note to maintenance supervisors and anti-freeze buyers: When you consider the value of the equipment you use, the investment your anti-freeze must protect and the expense of needless downtime, an efficient anti-freeze preventive maintenance plan makes good business sense.

The continuing savings made possible with "Zerone" and "Zerex" and an Anti-Freeze PM Plan far outweigh any momentary saving you might gain by using anti-freeze products of questionable performance and low initial cost.

Contact your Du Pont anti-freeze supplier or mail the coupon today – start saving now with the Du Pont Anti-Freeze PM Plan.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.) CME-4
"Zerone"-"Zerex" Section, Nemours 2420
Wilmington, Delaware

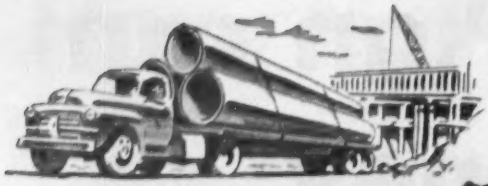
Please send more information on the Anti-Freeze PM Plan

*Name*_____

*Address*_____

*City*_____ *State*_____

*Company name*_____ *Title*_____



ONE 5-SPEED TRANSMISSION + AN EATON 2-SPEED AXLE = 10 EASY-TO-USE GEAR RATIOS

the right one for every road and load!

WHICH MEANS:

- Quicker full-load trips.
- Less wear on engine and power transmitting parts.
- More time on the job; less time in the shop.
- Lower maintenance cost.
- Fewer stops for gas and oil; lower operating cost.
- Improved maneuverability; wider range of vehicle usefulness.
- Easier driving; safer operation.
- Longer truck life; higher trade-in value.

More than Two Million Eaton Axles in Trucks Today. For complete information, see your truck dealer.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

EATON® **PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

NOZZLE MAN (center) applies 1½-in. of gunned concrete over wire mesh to seal water catchment in West Indies. Surface is cured under wet burlap (background) for three days because of tropical climate.

GUNNING RIG, model 1500 Nucretor powered by 315-cfm Joy compressor, hydrates dry mix at nozzle. Only 1.5 gal of water per bag of cement is needed in slurry.

Engineers Halt Erosion Of Tropical Basins With Gunned Concrete

THIN SURFACES of gunned concrete withstand tropical climates better than thin surfaces of poured concrete, according to Air Force engineers building three large rain-water catchments in the British West Indies. The 3 to 4-acre basins, carved out of porous coral, are being sealed with a 1½-in. coating of concrete gunned over reinforcing wire mesh.

When several new basins were needed in the islands to catch and store water, the 806th Engineer Aviation Battalion decided on gunned concrete because a number of existing poured concrete catchments in the area had deteriorated badly. Experience indicates that the tropical sun dries out thin coatings of poured concrete so rapidly that it is difficult to obtain adequate compaction and proper curing.

The gunning technique had to be modified slightly because of the climate, but the method gives better control over compaction and curing. In addition, the catchments are being built faster, with fewer personnel and less equipment, and without forming.

Only one gunning rig, a model 1500 Nucretor powered by a 315-cfm Joy compressor, is placing concrete for catchments on the islands of Mayaguana, Grand Turk, and San Salvador. The Nucretor, made by Air Placement Equip. Co, also

GUNNED CONCRETE . . .

continued from page 119

is being used to restore several badly eroded poured concrete basins in the area.

The machine is fed a 4-to-1 mix of portland cement and beach sand that passes a ⅜-in. screen. Sand and cement are mixed dry for 3 or 4 min in a 16S mixer.

The mix is agitated in the Nucretor's hopper and then carried by air stream through a 1½-in. inside dia discharge line to an aluminum nozzle. A water pump operated by air pressure feeds water through a line connected to the nozzle so that the mix is not hydrated until just before it leaves the Nucretor.

REBOUND amounts to 25% of sand in the slurry. Because of the hot sun it must be removed before it dries out, leaving a 3-to-1 mix in the finished surface.

Because of the hot climate, only 1.5 gal of water per bag of cement is added to the mix instead of the usual 3 gal per bag. Experience has taught the engineers that when the water content in the mix is reduced as much as possible, the gunned surface cures faster and better. The small quantity of water in the mix also pleased the engineers because all the water used has to be transported to the site in tank trailers.

The coating starts to set up in about an hour and it is ready for use within three days. The engineers say that the surface reaches a 28-day compressive strength of 5,500 psi and that the gunned concrete is "homogeneous, dense, and easy to apply."

Sand Lost by Rebound

The 4-to-1 mix ratio takes into account a 20 to 25% loss through rebound. In most climates, this rebound retains enough moisture to help the curing process, but in the West Indies it is necessary to scrape or broom away the rebound immediately because it dries out rapidly. Because the rebound is largely sand, the final sand-cement ratio actually is 3-to-1 in the finished surface.

Concrete is placed in strips of from 6 to 12 ft, depending upon location. Where old and new work join, the old strip is tapered for about 1 ft down to a feather edge. Overlapping joints created a problem at first, but by roughing the

(Continued on page 125)

KOHLER ENGINES

4-CYCLE • AIR-COOLED

K90.....2.5 to 3.6 H.P.
K160.....3.6 to 6.6 H.P.
K330.....7 to 12 H.P.
K660 (2 cylinder opposed) 12 to 26 H.P.

Modern design, air-cooled Kohler Engines in sizes from 2.5 to 26 H.P. offer a power range to fit all applications requiring a reliable and economical power source.

Kohler branch offices are located in sixteen principal cities. Sales and service distributors, throughout the country, have parts available, are ready to assist you in selecting a Kohler Engine best suited for your requirements. Write for information.

High-voltage magneto insures quick, all-weather starting. Efficient cooling at all operating temperatures and speeds.

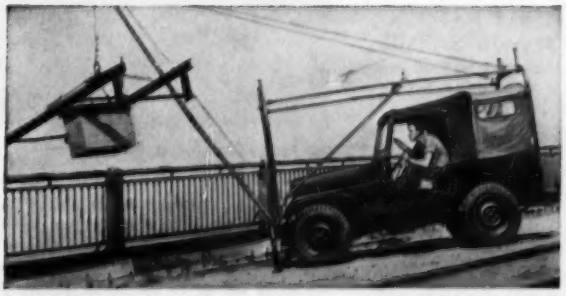
Kohler Co., Kohler, Wisconsin • Established 1873

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

Goes anywhere! The Universal 'Jeep' is often the first equipment to reach a construction job, and the last to leave. With the extra traction of its 4-wheel drive, it takes engineers over the roughest ground for first surveys. During construction it carries men and tools wherever they are needed, on or off the road. And when the job is done, it helps speed final inspection work.

How 4-wheel drive 'Jeep' vehicles help contractors save time and money!



'Jeep' with hoist lowers lighting equipment in a bridge deck installation. Because of its light weight, the 'Jeep' can haul materials over new concrete before it is strong enough to support heavy trucks.

'Jeep' Truck with hydraulically-operated back hoe prepares foundations, digs laterals or drainage ditches, and does other jobs too big for hand digging but too small for heavy-duty earth-moving equipment.

Vehicles in the 'Jeep' family help speed work and cut costs in almost every phase of construction.

In 4-wheel drive they go up steep grades—through mud, sand and soft earth—where other vehicles can't go. They shift easily into 2-wheel drive for travel at highway speeds. With power take-off or hydraulic lift, they operate many types of equipment from dozer blades to mobile drills for soil sampling. They stand up to the toughest usage—save you valuable time on job after job. Ask your nearest Willys dealer for an on-the-job demonstration or write for information.

The 'Jeep'®
family of 4-wheel drive vehicles

WILLYS... makers of the world's most useful vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

The Universal 293QS on a road construction site west of Tremonton, Utah, 1955.

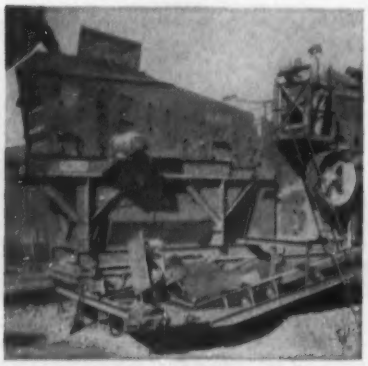
The Universal 293QS TwinDual Gravel King has

"Increased our pay load by 33⅓%, lowered operating costs 10c per ton"

Says Jed R. Abbott of Germer, Abbott & Waldron Construction Company, Tremonton, Utah

Abbott's company saved $20,000 on its first large order for aggregate produced by the Universal 293QS.

"After turning out 200,000 tons of material for U.S. Highway 91 last year," said Abbott, "this is the most economical plant we've ever operated. Our payload is a third more and our costs were ten cents a ton less than with other crushing equipment.



More than a gravel producer

The 293QS is the most versatile machine on the market—two plants in one! Inquire how you can convert it quickly from gravel to crushed stone production and back again.

"On the Highway 91 job, it took three D-8 Cat dozers and a scraper to feed the 293QS. The plant we were using before required only one D-8. That'll give you an idea of the difference in capacity."

You'll have a story to be proud of, too, when you work with the Universal 293QS. Producers are enthusiastic about the ability of this plant to make up for lost time. As Jed Abbott puts it, "The severity of Utah weather could mean the loss of much production, but with the Universal 293QS we have the capacity to fill larger orders, fill them faster, charge less and make more money in the long run."

Nearly everyone, like Germer, Abbott and Waldron, goes through seasonal or other costly shut-downs. Costly, that is, unless like Germer, Abbott & Waldron, you've discovered crushing equipment like the Universal 293QS — designed to recapture time lost — at a profit!

Volume production through improved design

Finished material on final belt. Exclusive Universal TwinDual roll crusher permits up to 100% wider discharge opening of the extra-large primary jaw crusher. Jaw efficiency increased by pre-screening pit-run material before entering crusher.

Write for complete facts on the Universal 293QS Gravel King now.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

327 8th St., N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

Twin Disc's new SP-321 PTO

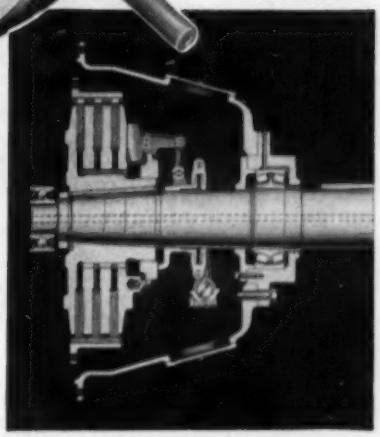
meets increased power requirements of modern industrial engines

Increased rpm. . . . increased hp output—that's the trend among industrial engine manufacturers. And that's where Twin Disc comes into the picture with its new SP-321 Power Take-Off—a friction clutch designed to meet the increased power transmission requirements of today's higher speed, higher horsepower industrial engines.

Unusually compact for its high capacity, this new PTO can handle up to 6730 lbs.-ft. of torque and transmit up to 602 hp at 1550 rpm. It's available with a standard SAE No. 00 flywheel housing adapter to meet the widest range of industrial power units in its hp and rpm ratings.

Other features include a triple driving-plate construction to provide ample friction surfaces to withstand excessive heat . . . a pilot bearing with double-width bearing race for greater lubrication retention and long life . . . and a spherical roller bearing at the clutch output shaft for greater overload and side-pull capacity.

The new SP-321 Power Take-Off —along with the recently announced SP-318 and SP-314—makes the Twin Disc line of heavy-duty friction power take-offs *the broadest, most complete line available.* For full information, write Twin Disc Clutch Company, Racine, Wisconsin. Request *new* Bulletin 308.



Twin Disc's new SP Power Take-Offs feature: counter-balanced engaging linkage; positive-type clutch engagement; pilot bearing with double grease shield; clutch plates with maximum friction area; spherical roller bearing; heavy-duty, oversize output shaft; easily adjusted clutch through pin and adjusting ring.

TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA

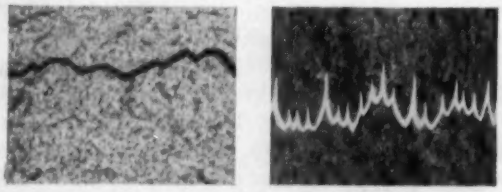
NOW . . . step up dragline output . . . WITH ALL-NEW BUCYRUS-ERIE BUCKETS

You swing more payload, less deadweight every hour with the new Bucyrus-Erie dragline buckets. A combination of an all-new, lightweight yet strong design and a new long-wearing material makes it possible.

The new material is BECOLOY, a special steel alloy with a tough, fibrous structure ideally suited to dragline bucket service. The new design features a "slicing-action" lip that penetrates material quickly, and a tapered basket shaped to load full and fast. Proper flaring and balance minimize spilling and bobbing. The inside design is smooth and the arch is extra high for fast, clean dumping.

Your Bucyrus-Erie distributor can help you select the right size and model of these new buckets to fit your job, to bring you better output performance than ever before. Three types are available—light, medium and heavy-duty —with either solid or perforated baskets.

BECOLOY . . . **exclusive new alloy for Bucyrus-Erie dragline buckets.**



The BECOLOY fracture surface at right shows the tough, fibrous structure that imparts high strength to this alloy. Ordinary steel fracture surface, at left, has a coarse, crystalline pattern.

19R56

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

GUNNED CONCRETE . . .

continued from page 120

CONCRETE is placed in strips. Edges are feathered and roughed.

previously laid strip with a rake and wetting it down, a good bond is obtained.

Originally it was thought that the only curing necessary would be to wet down the surface soon after it had set up. But because of the climate, a 72-hr curing period under wet burlap is necessary. Curing is rapid because of the low water ratio in the mix.

In addition to mixing and loading crews, three men are required to operate the gunning rig. One man handles the spray nozzle, another helps him control the discharge line, and a third operates the Nucretor's controls. Within a short period, the nozzle operator learned to apply an even coating free of thick and thin spots. The concrete is applied by holding the nozzle vertical to the ground and about 3½ ft from the surface.

The mix, prepared in the 16S mixer, is transported to the Nucretor by two 5-ton trucks and shoveled into the hopper. The engineer's report says that if an Air Placement Equipment Co. mix-elevator—which matches the gunning rig—had been available, the 16S mixer, two trucks, and the loading crew would not be needed.

The crane went down... but we weren't out!

Our Hartford Contractors' Equipment policy paid us $8,269.02 *(Based on Company File #HM53-2037)*

We were wrecking an old bridge to make way for a wider one.

The structure appeared sound. So we brought up our 32-ton crane, and used it for removing the bridge deck.

That wasn't such a bright idea. We'd hardly started when the abutment under the rig collapsed with a roar. The operator jumped clear as the machine toppled into the river.

It cost nearly $900 to get the machine to a shop for repairs. And over $7,300 more to fix it up. Under our Contractors' Equipment policy, the Hartford Fire Insurance Company paid these bills – a total of $8,269.02.

Who'd pick up the tab if one of *your* machines "fell in"?

Or was burned? Wrecked in a collision? Buried under a landslide?

Not you—if you had the broad protection of a Hartford Contractors' Equipment policy. It covers your equipment on the job . . . while being moved from one job to another . . . while idle between jobs. It saves you from loss caused by collision, overturn, explosion, theft, windstorm and many other hazards.

The cost of making sure you have cash when you need it for repairs or replacement is very reasonable. Get full details today from your Hartford Fire Insurance Company Group Agent or your insurance broker.

Year in and year out you'll do well with the

Hartford

Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey . . . *Hartford 15, Connecticut*
New York Underwriters Insurance Company . . . *New York 38, New York*
Northwestern Fire & Marine Insurance Company
Twin City Fire Insurance Company . . . *Minneapolis 2, Minnesota*

ALLISON TAKES ANOTHER IN POWER TRANSMISSION

New "FourSpeed" Torqmatic Drive boosts vastly increasing hauling ability both

Built for the big jobs – that's the story behind the new Allison "FourSpeed" TORQMATIC DRIVE.

With its 350 horsepower rating, this TORQMATIC Converter-Transmission team has the brawn and heft to take the biggest loads and toughest hills, like a breeze.

The TORQMATIC Converter provides silken smoothness during starts and speed changes – the automatic lock-up drive provides big fuel savings during extended runs, and speeds hauling cycles on every road over any terrain.

This quick-shift TORQMATIC Transmission has the driving ease that makes the biggest off-highway trucks and scrapers handle like a driver's dream come true.

And with the built-in TORQMATIC Brake (optional), it's got a big extra margin of safety.

Many leading manufacturers of scrapers and off-highway trucks are planning to install this new "FourSpeed" TORQMATIC DRIVE to increase the performance standards of their equipment.

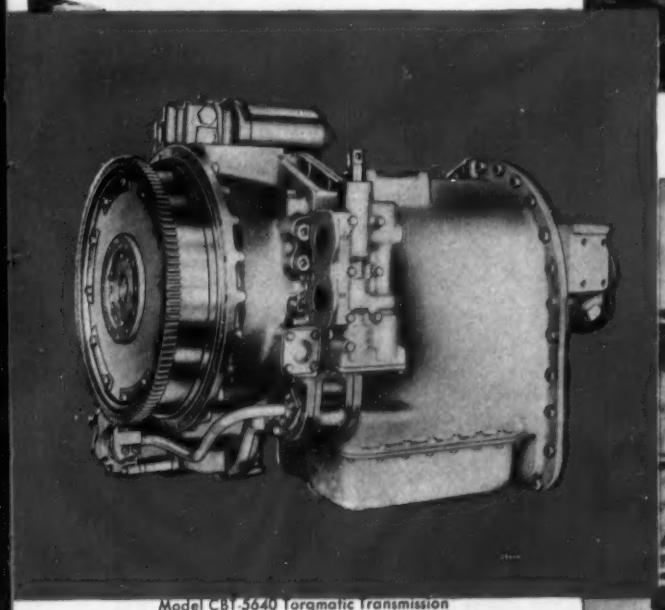
And the reason for the tremendous interest in this newest of all TORQMATIC DRIVES is simple.

It's the only heavy-duty converter-transmission team with an automatic lock-up drive, quick-shift range selection and TORQMATIC *Brake in one compact unit that is easy to install, free of troublesome piping and other miscellaneous accessories.*

For full details on the great new Allison "FourSpeed" TORQMATIC DRIVE in the equipment you buy or build, write Allison Division of General Motors, Box 894T, Indianapolis 6, Indiana.

GIANT STEP PROGRESS

operating speeds, up-hill and down



Model CBT-3640 Torqmatic Transmission
Write for brochure.

GM TORQMATIC

Allison

TORQMATIC DRIVES

LOADING the tandem scraper unit requires skill to prevent jackknifing. Operator loads rear scraper first to provide down drag and lowers blade of the forward scraper just before rear scraper is fully loaded. Cat D9 pushloads tandem unit.

DUMPING in fill area, the tandem unit requires no assistance. On well-maintained haul roads, the two scrapers roll along at speeds of up to 45 mph in fifth overdrive with a payload of 40 yd—18 yd in the forward unit and 22 yd in the rear.

Tractor Hauls Two Scrapers

CALIFORNIA CONTRACTOR L. A. "Babe" Crow is experimenting with a dirt-moving idea for speeding production on what may be the biggest cut in highway construction history. He is operating tandem scraper units composed of LeTourneau RU scrapers attached to Caterpillar DW 20s so that one tractor can haul 40 cu yd of material.

Actually the idea is not new. Crow says he used a similar scheme almost 20 years ago. But since then no jobs have come along that were as ideally suited for the method. And with the increase of scraper capacity, tractor units have only recently been powerful enough to handle two scrapers.

Bridge Approach

The job is a 3-mi, $7 million contract for a freeway approach to the Carquinez Bridge some 40 mi northeast of San Francisco. It includes a single cut totalling 9,700,000 cu yd and has 1,500,000 cu yd of additional excavation. Contractor on the work is a joint venture of Ferry Bros., John M. Ferry, Peter L. Ferry & Son, and L. A. and R. S. Crow, all of Glendale.

Making the job well suited for a tandem scraper operation are these factors: (1) the huge amount of excavation; (2) a downhill pay haul; (3) a large amount of overhaul—average haul on the whole job is 7,100 ft

EXCAVATION totalling 11,200,000 cu yd will open a direct freeway route to Carquinez Bridge, 40 miles from San Francisco. Cut (background) will slice down another 300 ft. It will provide material to add 100 ft of height to fill (foreground).

First tandem scraper units went in service early last month, but full exploitation of their capabilities must await long-haul operations next spring. At present the tandems, together with DW20 singles, are hauling from the big cut to a nearby fill with only 4,000-ft average haul. By next spring a smaller 800,000-yd cut will have been brought down to grade. And the fill between it and the big cut will have been brought up to grade. Then the tandem units can haul on a continuous straight line some 9,000 ft from the big cut to a fill area and adjacent disposal area.

The tandems on the job are standard DW20 tractor and scraper assemblies with a LeTourneau RU attached behind. To operate the second scraper, an additional power takeoff is mounted on the front axle of the DW20 tractor. With this assembly, 40 cu yd can be hauled at one time—18 cu yd in the DW20 scraper and 22 cu yd in the RU scraper. And with downhill haul roads (minimum grade will be ½%) the assemblies can reach 45 mph in fifth overdrive.

Loading

A Caterpillar D9 tractor push-loads the tandems as it would DW20 singles. The rear scraper is loaded first to provide down drag and assist the forward scraper in loading. The operators must develop some degree of skill to prevent jackknifing the assembly. The blade on the forward scraper generally is lowered just before the rear scraper is fully loaded. This excavates a trough that restrains the wheels of the rear scraper and helps to overcome the tendency to jackknife.

This season's operation by Ferry-Crow is in reality a test of the tandem scraper arrangement. On the 4,000-ft haul the tandem scrapers probably are just barely as economical as single scraper units. Initially four of the double scrapers were made up and brought to the job. Next spring, when the long haul is available, eight tandems may be used. And, if the operation is as successful as Babe

BEGINNING the cut, a Cat D9 mounting Ateco rippers to loosen the material pushloads a single scraper. The tandem units go to work when the return grade is low enough.

WATERING the fill helps meet California's 90% relative compaction requirement. Water wagon is a 5,000-gal Southwest pump-equipped tank mounted on a Euclid chassis.

ROLLING is carried out by both rubber-tired and sheeps-foot rollers. Here a 50-ton Ferguson pulled by a Cat D8 compacts fill that will reach a depth of more than 100 ft.

TANDEM SCRAPERS . . .
continued

Crow thinks it will be, even more might be brought on to the job.

Reason for using the LeTourneau RU scrapers—which are not manufactured any more—is that Crow has a fleet of them available. But there is no reason why other scrapers could not be used instead.

On the 4,000-ft haul, with a 14% down grade, average cycle is settling down to about 13 min. It takes about a minute and a half to load the double scraper units. The rest of the time is in the down haul, dumping, and return.

High Production

Even before the tandem units were brought on the job, excavation was averaging 25,000 cu yd a day (two 7-hr shifts with 8-hr pay). Production figures for the tandems are not yet available, but next year the contractor hopes to reach at least 40,000 cu yd a day with occastional days of as much as 50,000 cu yd a day. Production figures of this sort are needed to meet the 570 working day time limit ($7,900 a day penalty based on bond issue interest). And the grading has to be completed early enough to allow time for the concrete paving work.

Early development work on the huge cut was handled by DW20 singles. The cut is prepared for scraper operation by Caterpillar D9 tractors that mount Ateco rippers. Haul roads are serviced by Caterpillar No. 12 motor graders. And the fill work is serviced by a Southwest tank truck mounted on a Euclid chassis and by Ferguson 50-ton rubber-tired rollers.

Men on the Job

The Carquinez Bridge and its approaches is a project of the California Division of Highways, George T. McCoy, state highway engineer. Leonard C. Hollister is project engineer, coordinating all the Carquinez contracts financed by the bond issue. Construction of the approach freeway is a project of District IV, B. W. Booker, district engineer. V. O. Smith represents the District's construction department on the approach freeway, and Charles P. Sweet, Jr., is resident engineer.

For the Ferry-Crow joint venture, L. A. "Babe" Crow is sponsoring partner. R. C. Philbert is project superintendent.

Right from the start . . .

FAST

POWERFUL

AMERICAN BOSCH

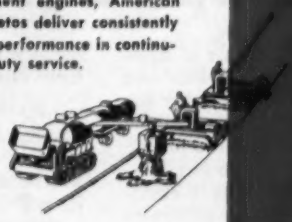
MAGNETOS

Fast, powerful—that's the power-packed story of American Bosch Magnetos—today's finest ignition units for construction industry engines. Many advanced features give these famous Magnetos greater power for split-second starting, PLUS the built-in stamina that assures years of constant, trouble-free service in construction engines. That's why they're so widely used as original equipment by so many leading engine builders.

For your every replacement need, there's an American Bosch Magneto precisely engineered for maximum efficiency at all operating speeds and loads. Moreover, American Bosch can serve you well with all the advantages of one of the world's largest and most efficient Service organizations. There's an AB Service Agency near you. Write today for application data on your largest heavy duty engines right down to today's compact, high-speed power units. American Bosch, Springfield 7, Mass. A Division of American Bosch Arma Corporation.

FOR CONSTRUCTION INDUSTRY SPARK IGNITED ENGINES

In dozers, gas-engine driven compressors, pumps, graders, paving machines and spreaders . . . wherever they are in use in Construction equipment engines, American Bosch Magnetos deliver consistently dependable performance in continuous, heavy duty service.



AMERICAN BOSCH

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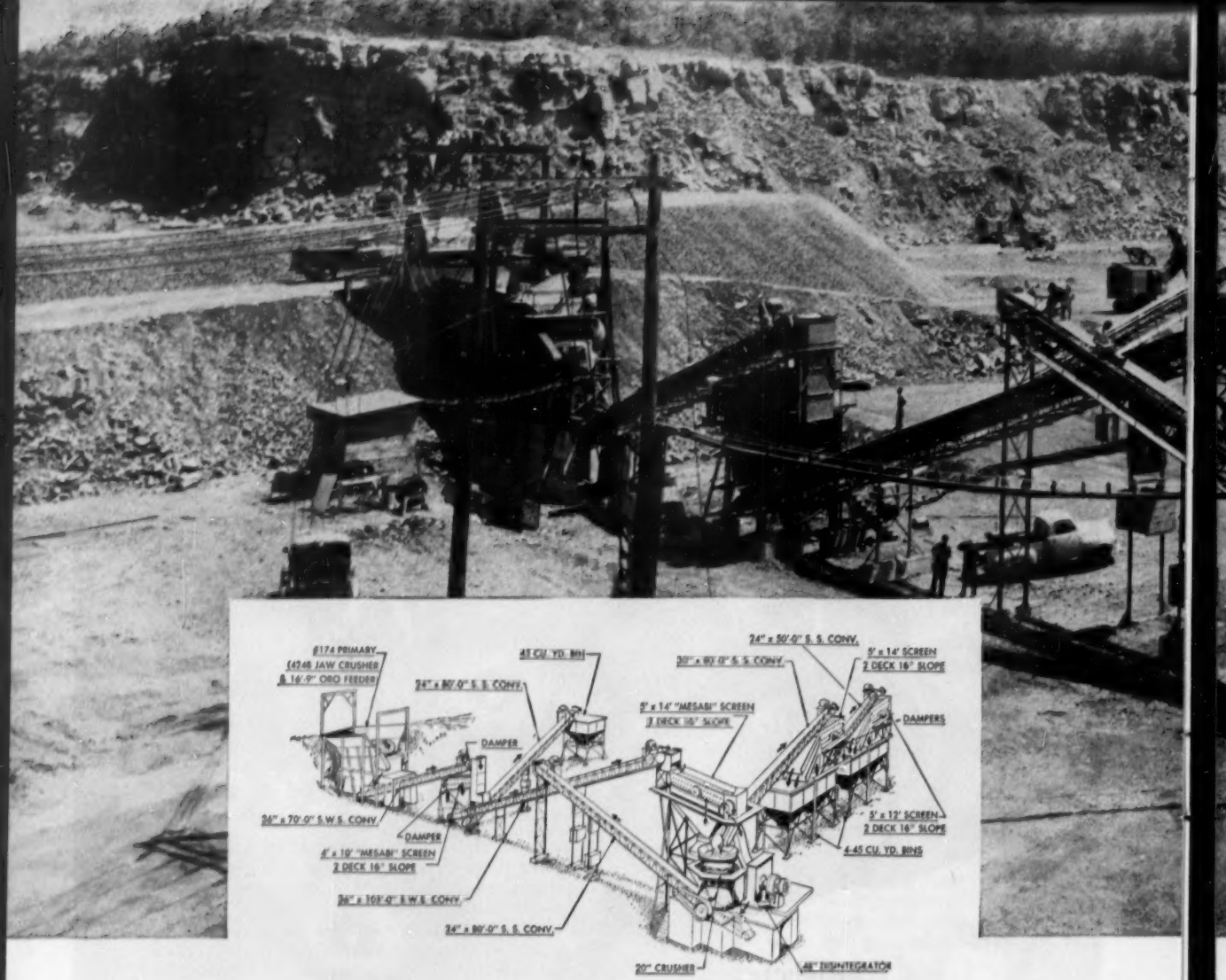


Big quarry plant has needed flexibility for many sizes on turnpike job

Assured high production of aggregates for the North-South Pennsylvania Turnpike was the deciding factor in the purchase of a new quarry plant by one of the nation's largest quarrying concerns. General Crushed Stone Company of Easton, Pennsylvania, was operating a 30-year old plant in their quarry near White Haven, Pennsylvania. Although this plant was operating satisfactorily, it could not begin to fill the demand generated by the new turnpike market along with other increased construction demands in the area. It was decided to erect a new plant on the quarry floor a few hundred yards from the older one.

Advantages of new installation

This new plant, engineered by Pioneer Engineering Works, Inc., was installed during the summer of 1954. It has a capacity of 250 tons per hour which more than doubles the output of the quarry. And it produces 5 sizes of stone simultaneously. When both plants are operating, more than 4500 tons of specification aggregates can be produced each 10 hour day. Besides doubling output, the new plant materially increased the over-all efficiency of the quarry operations . . . mainly by introducing more flexibility. For example, each plant complements the other by readily permitting *production of a complete range of stone sizes.* The new plant takes care of the entire output of crusher-run stone, as well as a few basic sizes which do not require washing; the older plant turns out washed material and other aggregates ranging from No. 4 stone down to sand.

World's largest jaw crusher

Production center of the plant is the primary plant with its 4248 PIONEER overhead eccentric jaw crusher fed by a PIONEER-ORO feeder.

The jaw crusher has a 4 cubic yard crushing chamber. It features a number of PIONEER first developments such as self-aligning roller bearings . . . hydraulic adjusting mechanism . . . horizontally split base for easier handling . . . double wall box type base construction . . . reversible manganese steel jaw plates . . . and bearings which can be hydraulically expanded for easy removal.

Regulated feed boosts output

Regulated feeding is a "must" in an

efficient crushing plant such as the one at White Haven. Use of the PIONEER-ORO apron feeder in the primary crushing unit gives General Crushed Stone these 4 advantages:

(1) Even, continuous flow of material to the jaw crusher increases output by ending alternate choking and starving.

(2) Labor costs are lowered as only one man is required to control feeding.

(3) Actual running time increases, as stops for dislodging choked or bridged material in crusher are greatly reduced.

(4) Profits increase as steady, continuous input results in greater over-all plant efficiency, and greater output.

Construction features which contribute to long feeder life are important to General Crushed Stone. For example, parts of the PIONEER-ORO feeder such as pans, sprockets, and rollers are made of a high grade wear-resisting alloyed manganese cast steel. This remarkable steel actually fights back against wear. The more it's exposed to impact and abrasion, the harder and tougher it gets!

Other units increase flexibility

Four heavy duty double-deck screens for sizing the stone are used in the installation. The first is a 4′ x 10′ PIONEER Mesabi screen with 2½″ and 1″ openings. From it, crusher-run stone can be discharged to a lateral belt conveyor and transferred to a PIONEER 45 cu. yd. bin. When desirable, this screen can be entirely by-passed by a damper arrangement.

Oversize from the first screen can be conveyed by belt to a secondary Mesabi screen which produces 5″ minus and 3¾″ minus material. These products are then conveyed to two PIONEER finish screens mounted in series over four 45 cubic yard bins. Oversize from the top deck of the secondary screen is chuted back to an intermediate crusher, while bottom deck rejects are fed to a cage mill. Both crushers are operated in closed circuit with their products being fed back to the main delivery belt of the secondary Mesabi screen.

Five additional stone sizes obtained on finish screens

The first PIONEER finish screen, size 5′ x 14′ yields three stone sizes 3¾″ to 2½″, 2½″ to 1¼″ and minus 1¼″. The latter size is transferred to the second PIONEER finish screen, size 5′ x 12′, which is fitted with wire cloth having ½″ and No. 4½ mesh openings and produces 1½″ and ½″ materials and screenings.

Dampers give added flexibility

The first screen is fitted with a damper which enables rejects from each deck to be chuted to the same bin. The second is also equipped with a damper which permits discharge of all plus No. 4½ mesh stone to the same bin.

For more information on PIONEER crushing and screening equipment, write Pioneer Engineering Works, Inc., Minneapolis, Minnesota (subsidiary of Poor & Co., Chicago) or see nearest PIONEER Distributor.

Pioneer
Continuflo **EQUIPMENT**

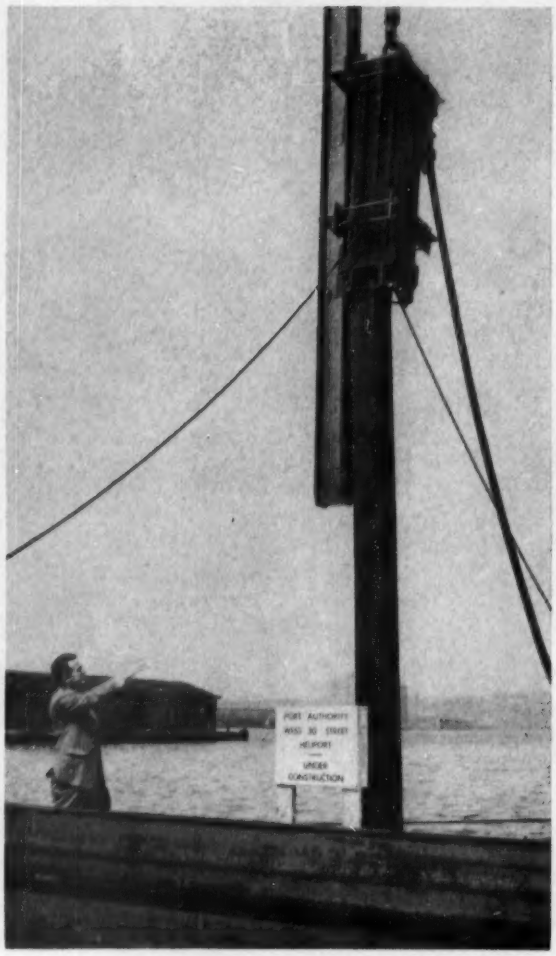
Here's a Way To Step Up Pile Driving

NEW YORKERS anxiously await the opening of their city's first commercial heliport, but George W. Rogers Construction Corp. of New York will settle for a final cost check on a time-saving pile-driving technique it developed for the job.

There's a good reason, too. The method—involving a simple, barge-mounted templet combined with a spud lead—permits first spotting, then driving, groups of seven piles up to 120 ft long. Though the job is small, George W. Rogers, president of the firm, is convinced he has a real cost-cutter for future pier construction.

New York's first heliport—scheduled for September completion—is nothing more than a $320,000 concrete and bituminous paved section of pier 70x400-ft in width, and having two 40x80-ft concrete touchdown platforms, that project 40 ft out into the Hudson River.

Each platform sits on 14 steel H-piles. Two rows of seven 12-in. BP 53-lb piles on 11½-ft centers will support each platform. Rows are 24 ft apart. Normally, simply spotting a pile, plumbing, then driving



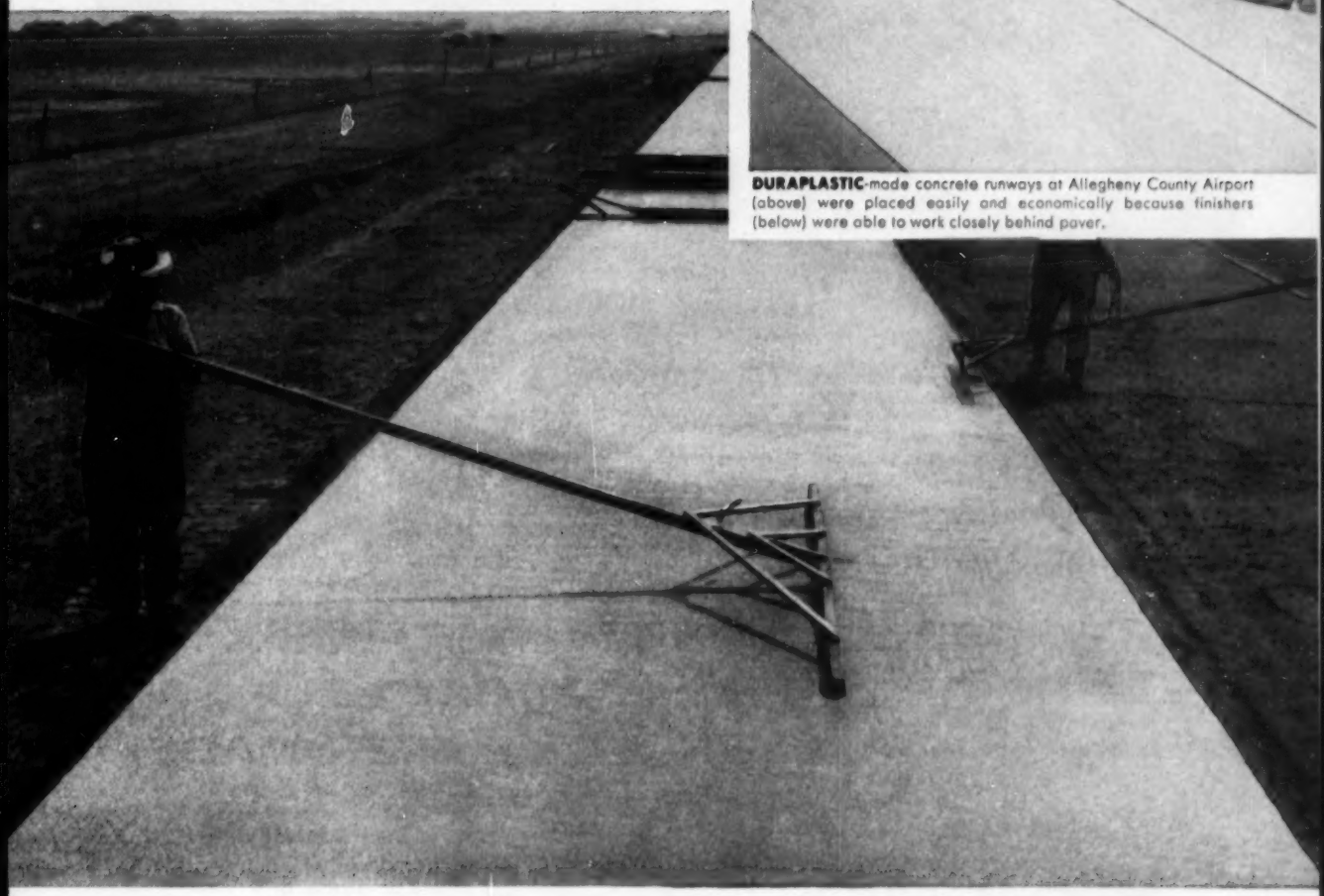
SLIDE fitted to pile hammer holds pile against spud lead which keeps pile plumb at top. Templet keeps bottom plumb.

BARGE-MOUNTED templet works with the spud leads. Templet permits first spotting, then driving, groups of seven piles.

HELIPORT will be little more than two concrete touchdown platforms (one shown) that jut 40 ft out into N. Y.'s Hudson River.

Why is this better concrete?

DURAPLASTIC-made concrete runways at Allegheny County Airport (above) were placed easily and economically because finishers (below) were able to work closely behind paver.



Because Duraplastic* minimizes bleeding and segregation

"For a fast paving job on the lengthy Allegheny County Airport runways, we used Atlas Duraplastic cement for better workability and placeability," says Mr. Anthony A. Benintend, Vice President, Ben Construction Co., Pittsburgh, Pa.

Mr. Benintend and many other contractors have found out for themselves that Atlas Duraplastic air-entraining portland cement minimizes bleeding and segregation in concrete mixes, allowing finishers to work closely behind the paver. And, with Duraplastic, the finished concrete is fortified against the effects of freezing-thawing weather and scaling caused by de-icing salts, and provides greater durability.

YET DURAPLASTIC COSTS NO MORE than regular cement—requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For information write:

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee
Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

*"DURAPLASTIC" is the registered trade-mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

AIR-ENTRAINING PORTLAND

D-189

Atlas® Duraplastic Cement

MAKES BETTER CONCRETE AT NO EXTRA COST

United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station.

PERFORMANCE REPORT ON AMERICA'S BEST SELLING TRUCKS:

"WE ORDERED 10 CHEVY TANDEMS . . . ONE OF THE MOST PROFITABLE MOVES WE'VE EVER MADE!"

. . . says Mr. F. Roland Sargent, Sargent Construction Company, Saginaw, Michigan—a typical user of Chevrolet heavy-duty trucks.

"After sizing up these new models . . . we ordered 10 of them. *And let me say it has been one of the most profitable moves we've ever made.* During the wet spring this year, we had conditions on a job near Bay City which were worse than our firm has ever operated in . . . I honestly didn't think any truck could plow through that sea of wet, oozy muck. But we decided to make a try. When those Chevy tandems went in, the mud sucked them down on their axles . . . sometimes two-thirds of the wheels were actually buried . . . those trucks were literally crawling on their bellies. But they kept rolling. And, to my amazement, we didn't even have to lighten the nine-ton loads!

"Let me sum up by putting it this way. We've put in a new order to enlarge our Chevrolet tandem fleet."

Why not see *your* dealer soon? . . . Chevrolet Division of General Motors, Detroit 2, Mich.

***Modern features* make new Chevrolet trucks the Performance Champs of the Heavyweight Class!**

New short-stroke 195-hp Loadmaster V8 powers Chevrolet top-tonnage trucks!

New Powermatic* — the first automatic transmission designed specially for big trucks!

New Triple-Torque Tandems hike G.V.W.'s to 32,000 lbs., G.C.W.'s to 50,000 lbs.!

Spicer 5-speed transmission† for extra pulling power, improved economy.

*Optional, extra cost, Series 5000 through 10000 models.
†Optional, extra cost, Series 9000 and 10000 models.

CHEVROLET

NEW CHEVROLET TASK·FORCE TRUCKS

Anything less is an old-fashioned truck!

PILE DRIVING . . .
continued from page 134

it does the job. Rogers' method permits spotting seven piles in a row.

Workmen splice 60-ft piles together on the dock to make single, 120-ft shafts. Additional pieces, where needed, are spliced onto the 120-ft sections after they are driven. A seven-pile templet secured by hooks to the barge deck properly spaces the piles and helps hold them plumb during driving.

A pile then is lifted by derrick and carried over into place. The 120-ft length and the 110-ft boom on the derrick make it necessary to drag the pile partially through the water and slip it into its templet mooring. (Water at the pier's edge is 20 ft deep.)

A workman checks the plumb, gives a signal to the derrick operator, and the pile drops into the river bottom. Force of the fall sinks the steel shaft deep enough to hold it plumb until the remaining six piles can be spotted. Driving then begins.

While the templet holds the lower end of the pile plumb, a job-built spud lead keeps a pile hammer plumb at the driving end. Two half sections of H-beam are bolted to the hammer. The sections are cut to serve as a slide for the pile. This permits passing the spud flush against the plumbed pile and against the hammer simultaneously.

The hammer then quickly drives home one pile after another. When one row is completed, the derrick boat is moved out and anchored in position for the second seven-pile row to be placed in the same way.

The concrete touchdown slab goes over the piles. The slab is anchored by tie rods to dead men on the shore to prevent the platform from walking out on the river bottom.

A 40x80-ft concrete platform will be built into the main deck to serve as a helicopter parking apron while the remainder of the 70x400-ft strip will be paved with bituminous.

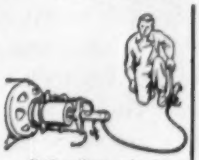
In addition to the heliport, Rogers has a contract to build a 20x40-ft terminal building at one corner of the port and surround the area with a 10-ft high protective fence. A screen also will be built on the river side of New York's West Side Highway.

Superintending the job is John Hoogendoorn. Edward Hannon is pile-driving foreman.

How Blackhawk Jacks work Maintenance Miracles

"PORTO-POWER" LICKS BIG JOB IN MINUTES! These Blackhawk remotely controlled hydraulic jacks supply power as it is needed — to push, pull, clamp, spread, bend, lift or press. Here, a 50-ton "Porto-Power" jack with electrically driven pump lifts a large crane. Repairs were made quickly and efficiently, and this goliath was back on its important job in jig time.

More maintenance miracles with Blackhawk "Porto-Power"



Pull pulleys, wheels, gears. No damaging hammering and prying. Safe.

Straighten buckets — tons of force where you want it to push out bashes.

Straighten dented dump trucks—make repairs on the site to cut downtime.

Bend pipe the easy way. Equipment handles all popular pipe, conduit.

Toe-lifting heavy equipment. Easy with "Porto-Power" Ram, Toe Lift.

Pre-stress concrete girders, bridge slabs. Gauges measure exact pressures.

Test soil, road surfaces for weight bearing capacities; gauge shows load.

Do rescue work with hydraulic power that lifts, pulls, spreads, saves lives!

PREVENT COSTLY DOWNTIME — speed construction jobs! Examples above only hint at the big story of maintenance and construction miracles with Blackhawk "Porto-Power" remote control jacks — of downtime *slashed to the minimum* — repairs made swiftly and easily, right on the job. Blackhawk builds the only complete line of hydraulic tools for construction. Order from your construction equipment supply house. Ask for "idea catalog" H-201 or write Blackhawk — it's free without obligation.

BLACKHAWK MFG. CO., Dept. J-2396, Milwaukee 46, Wisconsin

BLACKHAWK

World's Largest Manufacturer of HYDRAULIC TOOLS

P&H diesels give you double value

1. Money Making Power...

For steady production at a high profit you can't beat the P&H Diesel 687-C18 for powering heavy duty excavators. It has the power, response and stamina to give you smooth, fast work cycles with every excavator attachment. You do more work, faster, at a lower cost.

A rugged, fast accelerating engine with a high torque, this 6-Cylinder P&H Diesel furnishes power to successfully handle the variable loads and momentary overloads encountered especially in shovel, dragline and trench-hoe services.

Costly down-time for restarts is held to a bare minimum. When heavy digging is encountered, the 2-Cycle P&H Diesel 687-C18 has the reserve power and punch to "pull through" without stuttering or stalling.

2. Money Saving Power...

Also, with a P&H Diesel you burn fewer gallons of low-cost fuel, you operate with less down-time for servicing and repairs, you experience longer periods between overhauls.

These money saving features of P&H Diesel power result from the extra reserve of power which is built into the P&H Engine 687-C18 for heavy duty excavator service. Reserve power minimizes engine stress and strain created by momentary overloads—adds to engine life—lowers maintenance costs—contributes to fuel economy.

P&H Diesel money making and money saving power add up to more power at lower operating cost for greater production and more profit for you.

It will pay you to investigate P&H Diesel's unique double values for the powering of your heavy duty excavators from 1½ to 2 yards in size.

P&H Diesel Engine Division
Harnischfeger Corporation
Crystal Lake, Illinois

Please send me complete information on P&H Diesel Engine 687-C18 for powering heavy duty excavators.

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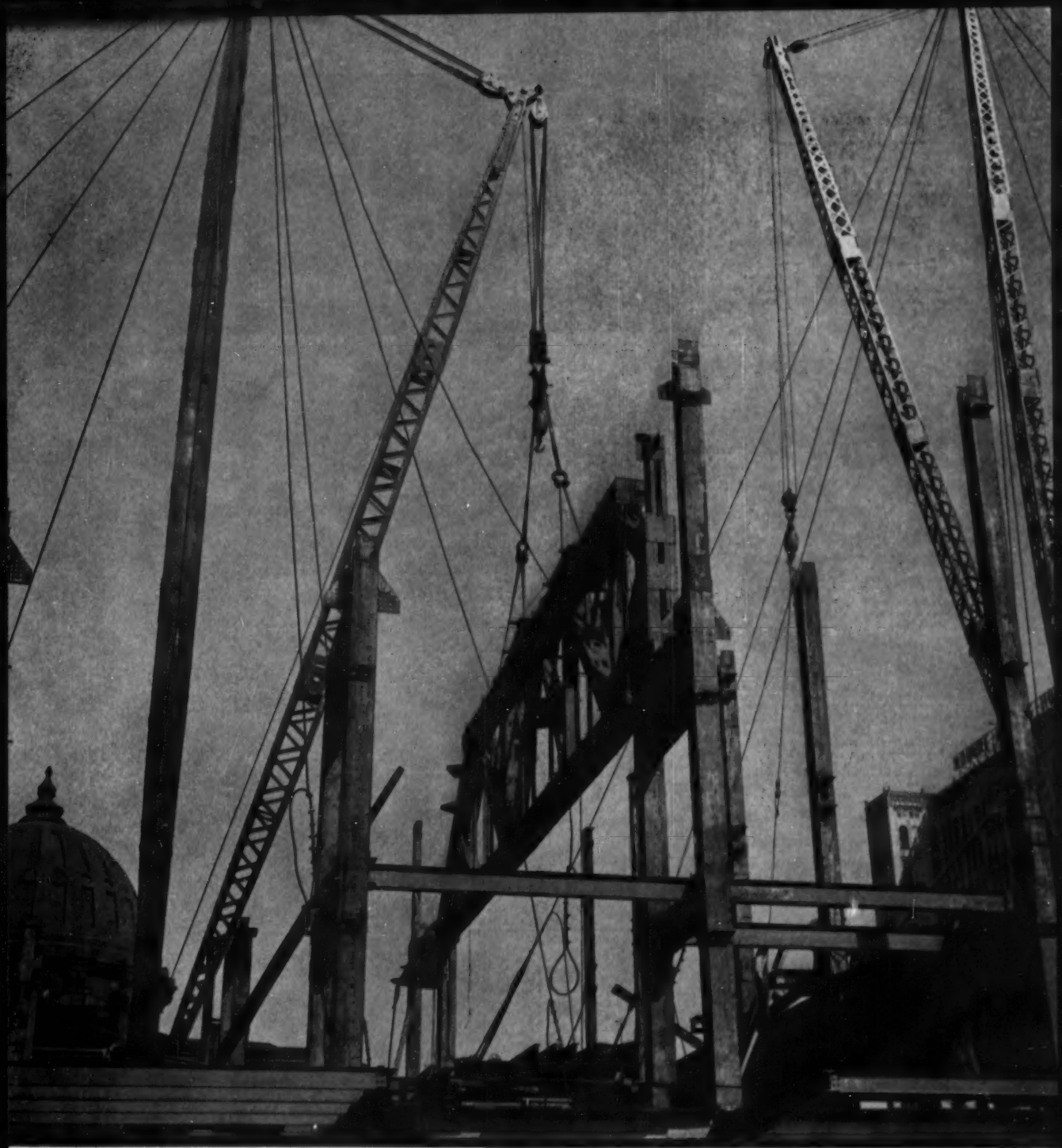
City_____ Zone____ State_____

For Modern Engineering Look to

HARNISCHFEGER

P&H DIESEL ENGINE DIVISION
Crystal Lake, Illinois



Architects for new Sheraton Hotel: Perry, Shaw, Hepburn and Dean, Boston; Structural Engineer: Maurice A. Reidy, Boston; General Contractor: McCloskey and Co., Philadelphia

Wire Rope at Work—Philadelphians are soon to have a great new hotel—the Sheraton. A 22-story building with de luxe features from lobby to roof, the Sheraton will be a unit of Penn Center, in the very heart of the city. It is to cost approximately $14,000,000.

Here is a picture taken as the steel skeleton was going up. It shows the erection of a 53-ton fabricated truss—one of five designed to support the ballroom ceiling and upper floors of the building. Muscle for the job was supplied by Bethlehem wire rope, Purple Strand grade, which has the strength and fatigue-resistance for even the heaviest lifts. As a matter of fact, it could hoist such trusses all day long and still be ready for more.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

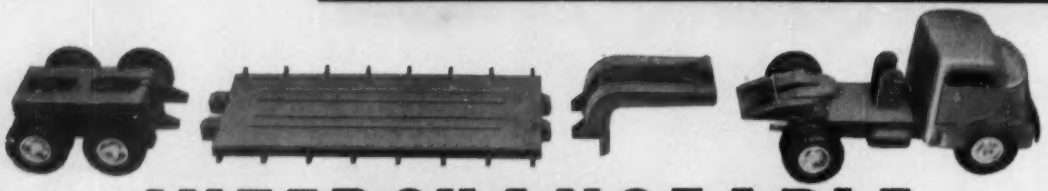
Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

CONSTRUCTION • EXCAVATING • MINING • QUARRYING • PETROLEUM • LOGGING • MANUFACTURING

The Talbert Flat Deck is a general all-purpose deck.

The Talbert Flat Deck with telescopic outriggers added is used for loads requiring additional deck width.

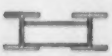
WITH *Talbert* TRAILERS® YOU SELECT THE RIGHT COMBINATION OF COMPONENTS TO MEET YOUR SPECIFIC HAULING NEEDS



INTERCHANGEABLE

The Talbert Raised-Center Deck primarily reduces trailer empty weight allowing more payload.

The Talbert Drop-Side Deck facilitates loading and reduces over-all height when transporting heavy cranes and shovels.



The Talbert Beam Deck also reduces over-all height and holds trailer empty weight at a minimum.

Different kinds of loads require trailer decks of various sizes and types. The demonstration model illustrated above shows how Talbert Flat Decks, Beam Decks, Raised-Center Decks, and Drop-Side Decks can be interchanged using the same Talbert Removable Gooseneck* and Removable Rear Axle Assembly. This added Talbert Trailer advantage means more economical and profitable operations flexibility for you.

Standard production Talbert Trailer components, as well as special customized components designed to your specifications, are available at production prices. Talbert Trailers are built in capacities from 10 to 100 tons. Send the coupon below for complete detailed information today.

MEMBER OF THE TRUCK TRAILER MANUFACTURERS ASSOCIATION

Note the tandem axle jeep dolly being used with this Talbert Beam Deck Trailer owned by Ft. Lauderdale Transfer.

Rieth-Riley Construction Co. interchanges four different decks using the same Talbert Removable Gooseneck* and Rear Axle Assembly.

Leroy L. Wade & Son had Talbert customize and build this special deck utilizing interchangeable components from his Talbert Drop Deck Trailer.

The 13 foot deck on this Talbert Trailer owned by Red Top Trucking Co. allows load weight to be transferred forward to the tractor tandem.

TALBERT CONSTRUCTION EQUIPMENT COMPANY

7952 WEST 47th AVENUE, LYONS (Chicago suburb), ILLINOIS • Phone LYons 3-3169.

Manufacturers of Talbert Low-Bed Trailers and Dump Semi-Trailers

TALBERT CONSTRUCTION EQUIPMENT COMPANY
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3 more contractors get profitable performance from International®-Powered motor graders

Arizona owner uses Model 118 Galion Motor Grader to construct irrigation ditches. Grader is dependably powered for low-cost operation, long life with International UD-525 diesel engine.

Paving contractor in Pennsylvania backfills bridge abutment with Austin-Western 99-H four-wheel drive grader driven by an International UD-14A Diesel.

Ohio contractor cuts ditches on a new highway with Model T-600 Galion Grade-O-Matic Grader equipped with International 140D diesel engine.

Here are three more contractors who have proven the long life, dependability, and profit-making performance of International-powered motor graders. Altogether nearly 50,000 International engines have powered motor graders, alone. It's proof that International power units give contractors the profitable kind of power they need and want.

Some of the many reasons for this in IH diesels are: exclusive injection and combustion systems for clear exhaust, full measure of power...over 15 to 1 compression ratio with full working expansion of hot gases behind the pistons, better fuel economy...heavy, counter-balanced crankshaft or vibration-dampeners for smooth operation (new gear-driven balancers on UD-350 and UD-14A)...and exclusive IH in-built gasoline conversion starting system which turns the engine 3 times faster than ordinary systems for fast, easy diesel starts in any weather.

It follows, that if so many contractors choose International engines for new equipment...they must be good for replacement, too. See the complete line of International diesel and carbureted engines at your International Power Unit Distributor or Dealer, soon.

CHOOSE FROM 17 HEAVY-DUTY INTERNATIONAL DIESEL AND CARBURETED ENGINES—FROM 17 TO 214 HP.

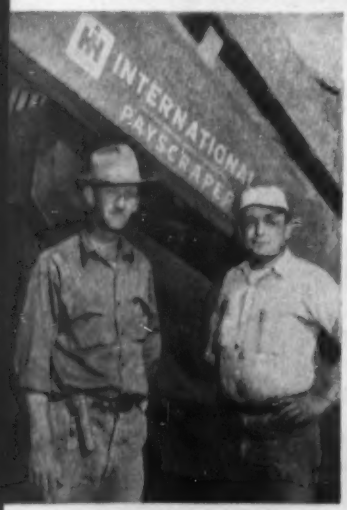
See you at the **ROAD SHOW CHICAGO** Jan. 28-Feb. 2, 1957

INTERNATIONAL® CONSTRUCTION EQUIPMENT

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors... Self-Propelled Scrapers and Bottom-Dumps... Tractors and Rubber-Tired Loaders... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks.

"Years of lowest downtime"

back preference for schedule-beating International® Equipment . . .



Foreman Milton D. Peterson and Supt. H. L. Radandt beside one of Radandt's new Payscrapers.

It's a $394,000 relocation and regrading job of Wisconsin 27, between Ojibwa and Ladysmith—involving clearing, grading, culverts, and sand gravel fill up to base course. Approximately ½ million cu. yds. of excavation and borrow to do.

Cuts as deep as 21 feet are required—and one 32-foot fill is necessary, because of a 22-foot deep marsh excavation, to base new road on firm footing.

A 12-unit International prime mover fleet—pushers, dozers, rubber-tired Payscrapers®, and crawler-scraper team—is what Contractor H. F. Radandt, Inc., banks on to "wind 'er up," ahead of the Wisconsin winter, with a profit!

"Have been using International crawlers since 1946," states Supt. H. L. Radandt, for the contracting firm. "Presently we have nine International crawlers and three Payscrapers in the fleet. Years of actual operation have proven International equipment had given us good service with lowest downtime. We do all our own repair work, and International design is simple to work on."

Prove how exclusive Planet Power steering with full-time live power on both tracks, plus finger-tip operating ease, give the International TD-24 exclusive production-boosting advantages! Compare capacity of new bonus-powered International equipment to anything else on tracks or wheels. Find out what International unit assembly construction means for overhaul speed and simplicity—for reduced downtime—for new upkeep economy. See your nearby International Construction Equipment Distributor for a demonstration!

"**The new design 75 Payscraper** bowl loads and unloads, fast and easy," declares Supt. Radandt. "Estimated average load: 18 pay yards." Here, loading time with TD-24 as pusher, the 75 heap-loads in 45-60 seconds, in silt-sand-gravel mixture!

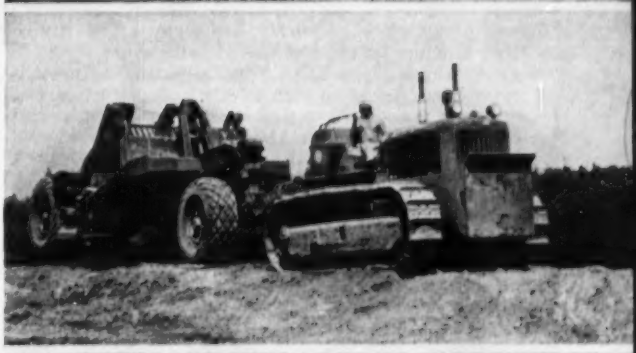
—by H. F. Radandt, Inc.,

Eau Claire, Wisconsin

See you at
the ROAD SHOW—CHICAGO
Jan. 27 to Feb. 4, 1957

Dumping of the new 75 Payscraper takes only 10 seconds. Higher apron lift, and bigger apron opening assure new dumping speed and positive clean-out ability. The new Payscraper's high horsepower - to - capacity ratio permits rapid acceleration to 24 mph top speed — a big yardage-booster!

The three Payscrapers in the Radandt fleet average 2200 cu. yds. per 10 hours—on a 6300 lineal-foot round trip. "The new '75' has matched engine power to deliver the payload fast, and flotation to take roughest pit or haul-road conditions," adds Mr. Radandt.



This torque-converter TD-24 is one of three International crawlers towing scrapers on the job—hauling up to 1000 lineal feet one way. With 200 net engine hp and full-time traction power on both tracks with Planet Power steering, this outfit hauls fill dirt into one of the 22-ft. deep cuts.

Another TD-24—a veteran in the Radandt fleet—spreads and compacts fill dirt on one of the marsh-excavated spots. TD-24 Planet Power steering is particularly productive on all blade work. Full-time live power on both tracks results in faster cycles, bigger loads.

INTERNATIONAL HARVESTER

INTERNATIONAL Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

Owners everywhere report:

"4-in-1 Skid-Shovel beats a fleet of limited-duty rigs...outearns 'em all!"

"Clamshell cuts out hand labor"—Boh Brothers Construction Co., New Orleans, La. "If ever one machine could 'do it all,' our International Drott TD-9 Four-In-One Skid-Shovel is it," states Sam Venus, for Boh Brothers Construction Co., New Orleans, La. "Its clamshell action, for example, cuts out hand labor. We produce 150-175 5-yd. truck loads per 9 hrs." Watch the clam "surround" loose stuff—heap itself in one fast gulp!

"Loads 'high ones' others can't"—Mike Ferrantino, Dearborn, Mich. Mike Ferrantino, Dearborn, Mich., using his TD-9 Four-In-One, averaged loading 26 5-yd. trucks per hr., on a housing project. "I can load 'em from any angle, high tandems and all, with the high-reaching, bottom-dumping clamshell," he says. "My Four-In-One does so many jobs others can't do—even cleans itself of damp clay, dumping as a clamshell."

"Moves material where others quit"—Consolidated Construction Co., Bayside, Va. "Our International-Drott TD-9 Four-In-One will move material where other units quit," declares Consolidated Construction Co., Bayside, Va. "It's a multi-purpose rig, has high reach, and will out-load anything in its size class." Here they're getting accurate "carry-type scraper" action on a housing project, with Four-In-One in Bullclam position!

"Beats the others in job variety"—Leon Sumler, Memphis, Tenn. "With it, I can do a far wider variety of jobs than the others," reports Leon Sumler, Memphis, Tenn.—of his International-Drott TD-9 Four-In-One, shown tearing up old filling station slab and footings to load out. "The clamshell speeds the job," he adds, "and Drott bucket roll-back makes it possible to keep heaped loads. It's the one-tractor-man's ideal rig."

4-in-1

Prove versatility, unlimited—with the International-Drott 4-in-1 as Skid-Shovel, clamshell, Bullclam, and bulldozer. **Prove you get 4 big-capacity material-moving rigs in one sensibly-priced unit!** Try other Drott exclusives, like pry-action break-out and shock-swallowing Hydro-Spring. Ask your International Drott distributor for a 4-in-1 demonstration!

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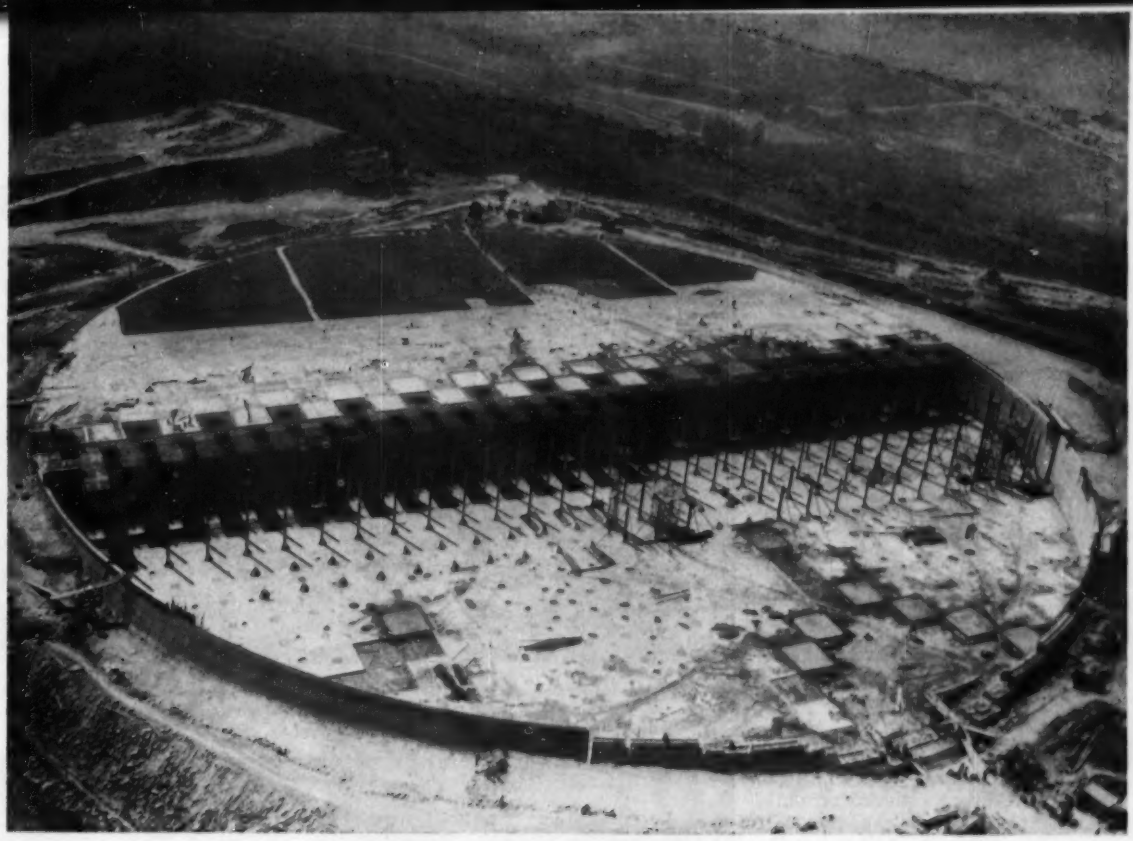


ROOF SLAB POUR progresses swiftly on South African reservoir job because of a contractor-developed forming method that eliminates need for dismantling forms and uses lightweight steel trusses as stringers. Mobile towers move fabricated form sections.

Mobile Forms Raise a Roof

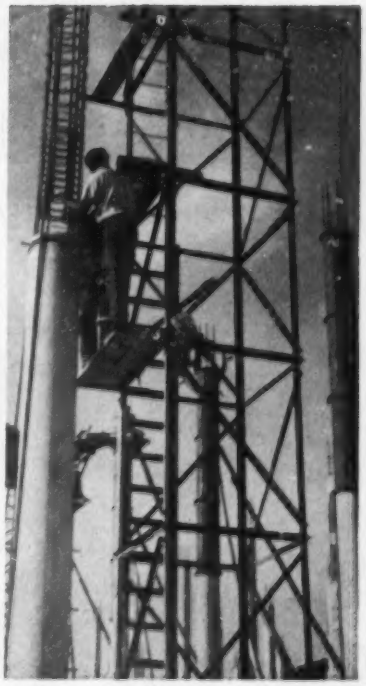
AN INGENIOUS South African contractor has developed a novel set of travelling forms to speed erection of reinforced concrete roof slabs for South Africa's largest water reservoir. The method eliminates the need for dismantling forms during stripping by making use of movable towers, lightweight steel trusses as stringers, and concrete columns as upright supports.

Stocks & Stocks (Pty.) Ltd., Pretoria, South Africa, developed the forming system to place 6½ acres of concrete roof over the $1.3 million Meyers Hill Reservoir near Johannesburg. It is a reinforced concrete covered 60-mg water storehouse set on a ridge of rocky hills 3 mi. south of the gold center.

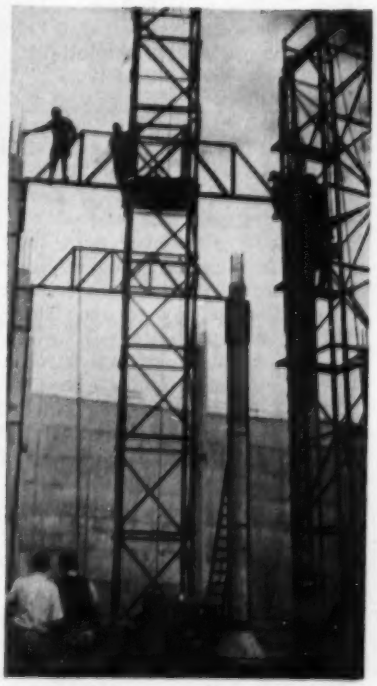
All Concrete Construction

A gravity mass concrete wall encircles a 9-in.-thick reinforced concrete monolithic floor, 613 ft in diameter, free of a single expansion joint. The splayed heads of 732 concrete columns 35 ft high and 18 in. in dia support a 7½-in. flat slab roof.

Continued on next page



TOWER proves handy support from which workmen set column reinforcing and forms.



LIGHTWEIGHT TRUSSES are placed over channel props to support steel slab forms.

STOCKS FORMING SYSTEM . . .
continued

The reservoir site is a rocky summit. More than 180,000 yd of sandstone, quartzite, and gold-bearing conglomerate had to be blasted away. Rock was removed by millisecond delay electrical blasting. Approximately 800 yd of rock were shot per blast daily. Power shovels loaded blasted rock into 5-yd rear dump trucks that deposited their loads against the exposed outer face of the concrete wall.

To avoid double-handling the material, the contractor started construction of the wall long before excavation of the reservoir basin was completed. No heavy blasting was done within 75 ft of the concreted sections.

Workmen concreted the 20-ft-thick wall in blocks 4 ft high and 28 ft long. Concrete was supplied by portable mixers placed on embankment fill near the face of the wall.

Columns were poured in groups of four in two lifts with the help of portable platform hoists and a mobile tubular tower. Tubular steel forms 16 ft high were placed around upright cages of column reinforcing steel. After a 16-ft lift of columns had been poured, the steel forms were raised by the platform hoist. Timber raker braces wedged against the concrete floor slab held the forms upright for the top pour.

Slab Forming

The real beauty of the job lay in the travelling forms. Since the slab height was 35 ft above the floor, the contractor decided to use a travelling type form consisting of steel sheeting set over light steel trusses serving as stringers. Slab bays were 20 ft square. A column stood at each bay corner. These were used as uprights.

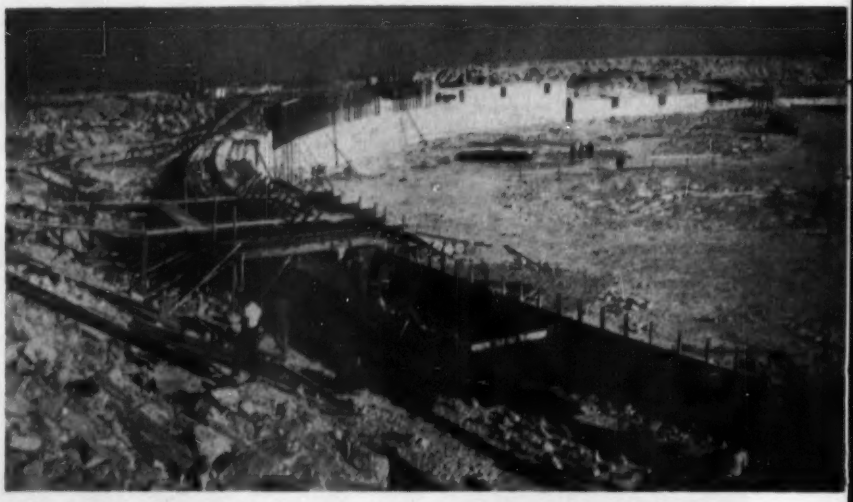
Clamping steel channel "props" to the columns provided a seat for the 20-ft-long steel trusses. Channels were provided with adjustable head pieces to accommodate the 18-in. roof "fall." Concreting was done by wheelbarrow. Concrete was supplied from a batch plant set up on one of the hills.

Stripping

As each roof bay form and truss combination became ready for stripping, workmen brought the tubular mobile traveller under-

(Continued on page 149)

POWER SHOVELS load rock blasted from hillside into 5-yd dump trucks for placing against reservoir's gravity wall. Shovels are three Ruston-Bucyrus and an Eimco Rockershovel.



GRAVITY WALL pour preceded excavation of the reservoir core. Method permitted contractor to remove rock from hillside and place it against wall without double handling.

RESERVOIR DECK is placed in four-column bays 20x20 ft. Trusses set on channel props connect columns. These are connected by timbers followed by joists then steel forms.

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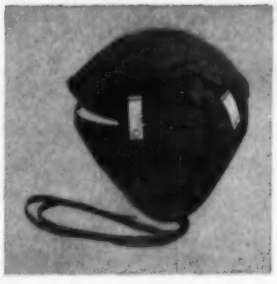

M-S-A WINTER LINER TAB-TYPE

Four snap-tabs permit quick and easy fastening and unfastening of earlugs. This liner is made of the same tightly woven, warm, and waterproof material used in the Zipper-Type. Designed to accommodate every type of M-S-A Protective Hat or Cap without removing suspension. Write for details.

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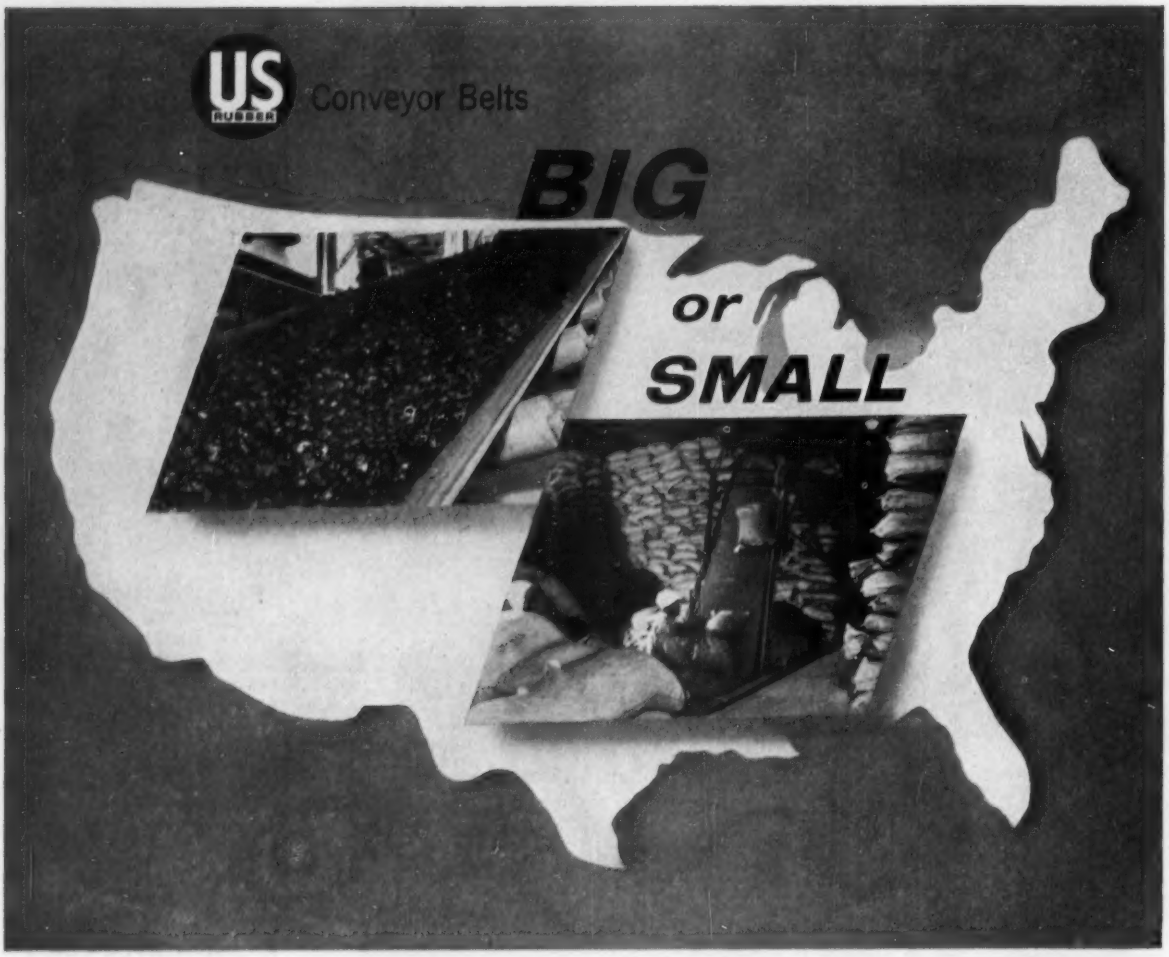

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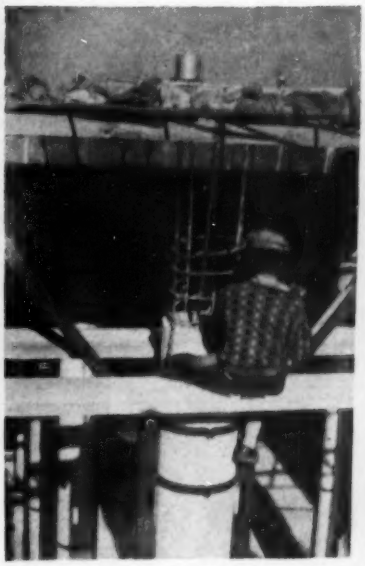
Mechanical Goods Division

United States Rubber

STOCKS FORMING SYSTEM . . .
continued from page 146



LABORER CHIPS column top in preparation for splayed head. Safety belt holds him secure while he works atop 35-ft column.

neath a bay. Jacks set on the tower lowered the form-truss team free of the trusses of the adjacent panels.

The traveller then was moved to the next bay section where the forms and trusses it carried were raised to proper slab height. Truss legs then were secured to a new four-column set of channel props. Approximately eight panels were moved daily in this way. The contractor used 120 sets of forms so that on some occasions all 48,000 sq ft of roof was in position at one time.

Men on the Job

H. G. Stocks, director of the contracting firm, designed all formwork and plant layout. Supervision of the job was under T. A. Forbes, project manager. G. F. Huskinson was resident engineer for the Rand Water Board.

A Major Water Project

The reservoir is one of the major units in an extensive expansion of water supply facilities being carried out by the Rand Water Board. Water for the reservoir is pumped from the Vaal River more than 30 miles distant. Elevation at the river is just over 4,000 ft; at the reservoir, elevation is 5,950 ft above sea level.

SPEED UP
THESE TOUGH JOBS

Ingersoll-Rand GR-125 Gyro-Flo Compressor, Continental-powered, operating Mall chain saw cutting 12" x 12" timber to repair pier. Equipment in use on an eastern railroad.

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Powered by two 194 h.p. engines at rated speed, 365 h.p. is delivered to the power train. Each of the tracks is driven independently through separate Torqmatic Drives giving the TC-12 faster, easier steering and greater drawbar pull at higher speed. There's no clutch—shifting from one of the three speed ranges to another is done under full power —top speed in forward or reverse is 8.3 mph.

Have your Euclid dealer give you all the facts on the TC-12—compare with your present big tractor equipment and you'll know why so many owners have proved that *Euclids are your best investment.*

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Years Ahead in Performance

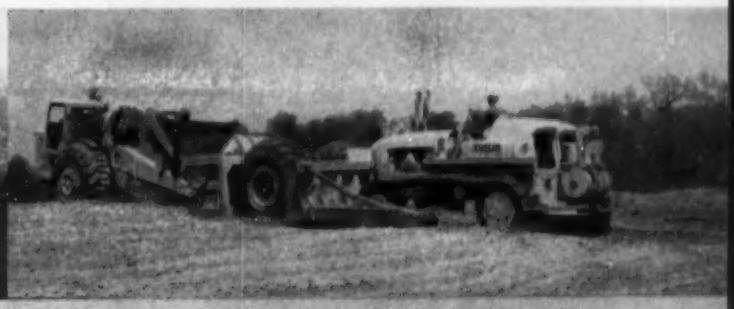
on today's tough jobs!

Another job where the TC-12 proved its ability to get more work done faster—land clearing in Virginia. Excellent maneuverability in tight quarters, steady flow of power, and typical Euclid brute strength, make this Twin-Crawler a dependable top performer for this kind of big tractor work.

The TC-12 has no equal for pushloading large scrapers or pulling big earthmoving equipment. Each track is driven by a separate engine and Torqmatic Drive giving the Euclid tractor outstanding maneuverability. On their Indiana Turnpike contract, Union Builders kept the job ahead of schedule with a fleet of "Euc" scrapers pushloaded with the TC-12.

Compare the accessibility and performance of the TC-12 with your present big tractor equipment—your Euclid dealer has facts and figures from all kinds of jobs.

A. E. Dick Construction Co. is using 2 Twin-Power TC-12 "Eucs" for stripping overburden at a big open pit anthracite operation in Pennsylvania. Tremendous power and traction, unequalled in any other crawler, gives them more work-ability on tough jobs as well as on routine earthmoving work.



Equipped with a Tipdozer, this TC-12 proved a versatile machine on a big subdivision grading job. It pushloaded a fleet of big Euclid scrapers—getting heaped loads of 21 and more yards in a hurry—and did a lot of land leveling and clean up work itself.

Cadell and Oman put their first TC-12 to work pushloading "Euc" Scrapers on a 3 million yard railroad job in Georgia. Independent track drive, good visibility for the operator and power matched to the job requirement enables the TC-12 to maintain maximum scraper production.

Easy operation of the TC-12—Torqmatic Drive eliminates master clutch and manual gear shifting—makes this "Euc" a high production machine. For a relocation project on U. S. Route 16 in Michigan, Sugden and Sivier used a cable controlled blade for dozing.

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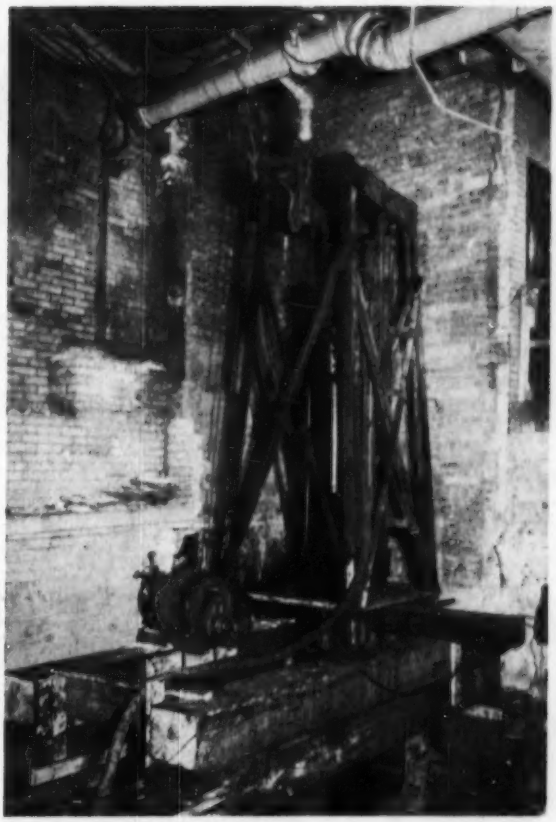


COLLAPSIBLE pile-driving rig — a hammer suspended from a set of "A" frames—works like a charm in limited 12-ft headroom. The rig is lightweight, easily dismantled, and can be brought into normally inaccessible spots and easily reassembled.

Pile Driver Fits in Tight Spots

HOW WOULD you drive a baker's dozen of 40-ft piles in a sub-basement where you have just 12 ft of driving headroom and only a tiny 3x4-ft opening through which to bring in equipment?

There are a lot of expensive ways, but a New York contractor found a cheap way to do the job with a collapsible, pile-driving rig that proved itself on the first try.

Hegeman-Harris Co., New York general contractors, recently got a difficult and unusual job. It was to build a structural steel column in the 24-story American Surety Building in the heart of New York's Wall Street section. Purpose of the column was to support equipment for an air-conditioning system being installed in the building. Putting the column in, however, meant first building a foundation. To do the job, Hegeman-Harris called in Underpinning & Foundation Co., New York heavy construction contractors.

"They handed me a set of plans," said Sidney P. Gilbert, the firm's vice president, "that showed a simple concrete pile cap sitting on 13 open-ended steel piles. It looked like there was nothing to the job—until I went to see it."

The pile cap had to go under the building's second sub-basement which housed the building's electrical and heating equipment. Walls and ceilings were covered with electrical lines, switch boxes, electrical connections, pipes, and other attachments.

All this gave the contractor only 12 ft of headroom in which to work. An added problem was that the only access to the job was a small 3x4-ft sidewalk ash hoist which ran 30 ft up to sidewalk grade.

"Couldn't Jack the Piles. . . ."

"We sure couldn't jack the piles down," Gilbert said. "There was nothing we could use as reaction. And putting up a needling system to do the job would have been too costly for just 13 piles."

Driving seemed to be the only answer. But the question was how the necessary equipment could be brought in and used in such limited quarters.

Collapsible Pile-Driver

Gilbert devised a piece of equipment which consisted of a hammer supported by a collapsible set of four A-frames. The hammer had clamps welded to two opposite sides. These later would sit in slides permitting the hammer to be raised and lowered by cable.

The frame measured 11 ft high, 2½ ft wide at the top, and 4 ft wide at the bottom. Three angle irons braced the legs of each frame. All connections were bolted together for quick and easy assembly.

Two of the frames were fitted with two 2-in. angle irons welded vertically to their sides. These were to serve as slides for the brackets welded to the hammer sides.

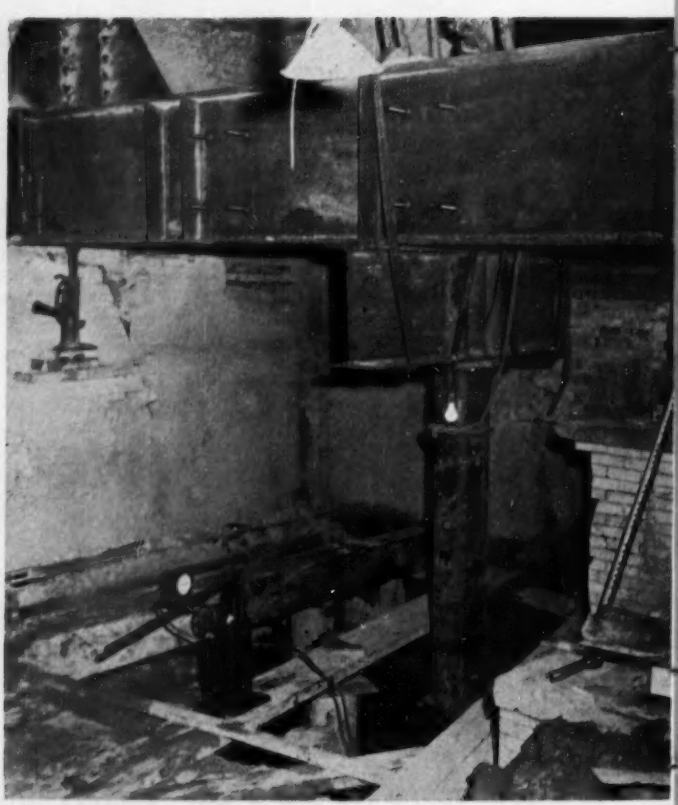
To erect the driving equipment the hammer was stood upright and the frames were bolted together around it. A single cable lifted the hammer. The cable is secured to one bracket, circles over the top of the frame and down to the bracket on the opposite side of the hammer. The cable then circles over the top of the frame again and down to a trigger hoist set off the rig.

Tests Prove Favorable

Tests conducted in the contractor's yard proved the rig a handy one. The equipment was dismantled and shipped to the job. There, the driver along with other equipment and sections of piles, timber, and beams were lowered by crane through the 3x4 opening.

(Continued on next page)

ENGINEER checks settlement of pile during application of load test. Hydraulic jack reacting against beams exerts 124-ton load.



REACTION for test comes from two beams crossed over pile cluster. Beams are welded to plates on the building's columns.

While equipment was being lowered, workmen broke through the sub-cellar floor and excavated a pit 12x12x4 for the pile cap. One side of the pit came adjacent to a basement wall. This side was lined with a 4-ft-high timber sill to support the pile-driving equipment. The cellar floor served as support on the opposite side.

Once pile centers were determined, workmen placed two 20-ft 12x12's across the excavation. Tops of these were greased to provide easy movement for two 12-ft 12x-12's placed over them. The skids seat the hammer and frame.

The pile hammer then was raised by snatch block and held vertically over the pit and between the skids while the frame was erected around it along with its raising and lowering cable.

Workmen then slipped a 7-ft section of pile through the frame into position. A 600-cfm Joy compressor at street level supplied air through a hose which ran down the ash hoist to the driver. Workmen added sleeves and pile sections during driving until refusal was reached—about 40 ft down.

Rig Moved on Skids

The rig then was skidded over to the next pile location by a Simplex track jack reacting against the timber sill. Track jacks also moved the rig and timbers transversely over the pit.

When all 13 piles were driven, the pile cores were mucked by water and air jet. To protect electrical equipment, workmen put a canvas tent over the pile cluster and diverted the muck to the adjacent cellar floor. Piles then were redriven to refusal to regain load lost by mucking.

The contractor then ran high early, 2,500-psi concrete down an elephant trunk in the ash hoist, along a series of chutes to the piles, and, finally, down into each pile through a second elephant trunk.

Test Loading the Piles

Three days after concreting the contractor applied a load test to two piles. Load was applied by hydraulic jack reacting against two steel beams welded to two of the building's structural columns.

Steel plates were tack-welded to two columns on each side of the pile pit. These were connected over the pit with two 33WF141 beams spaced 3 ft apart. Three 24WF120 spacers connected the beams at their one-third points. Lashing a 5-ft 2-in. 24WF120 stub beam to the underside of the beams provided an easily moved brace against which the jacks and jacking dice could be placed to make the test.

A steel plate went over the pile head to serve as a seat for a 150-ton hydraulic jack. A second plate went over the jack head. The space between the jack and the lashed-on piece of stub beam was diced with a spare length of steel pile. Workmen then applied a 124-ton load in 20-ton increments. The load was left for three days.

Equipment then was dismantled and removed from the job the same way it came in—by crane through the ash hoist. Workmen meanwhile formed, reinforced, and concreted the pile caps to complete the foundation portion of the job.

Raymon Thaler superintended the work. Moran, Proctor, Mueser & Rutledge of N.Y.C. were consulting engineers.

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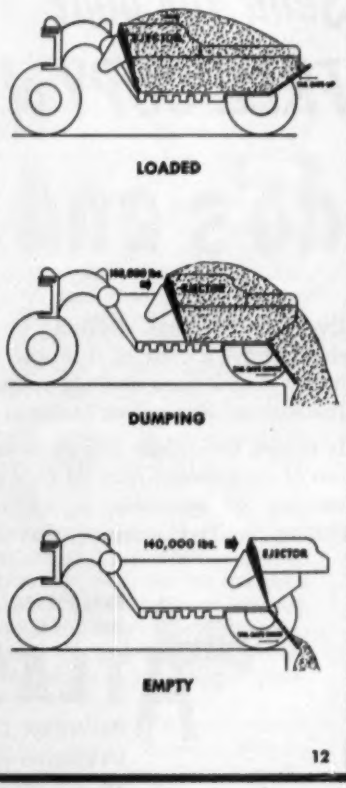
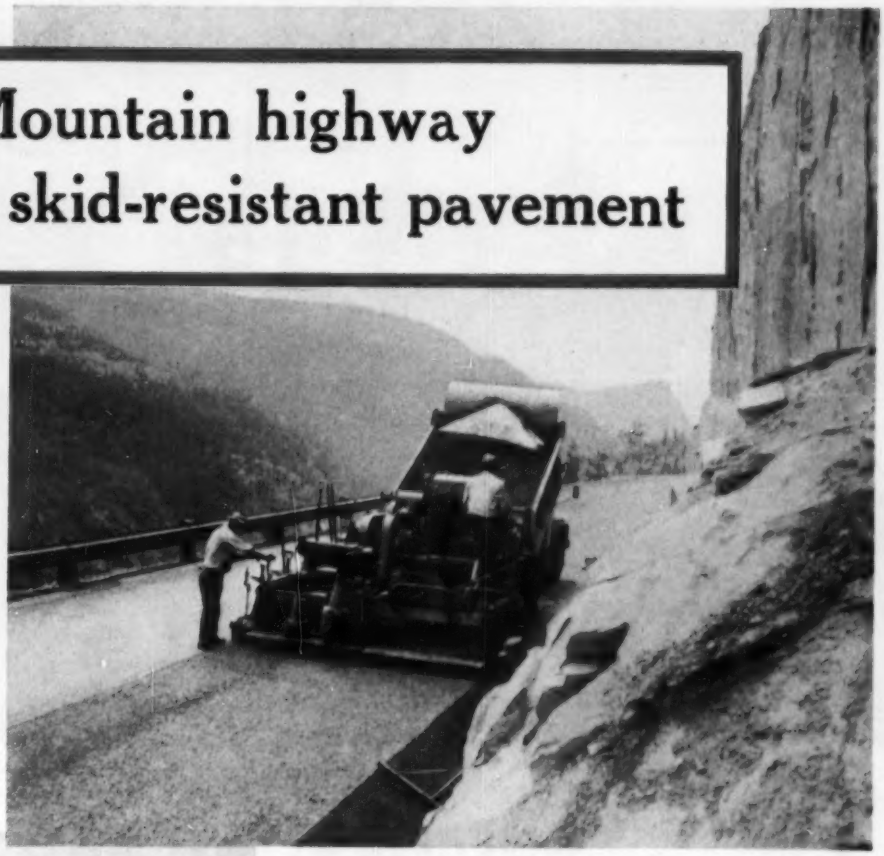


Rocky Mountain highway needs skid-resistant pavement

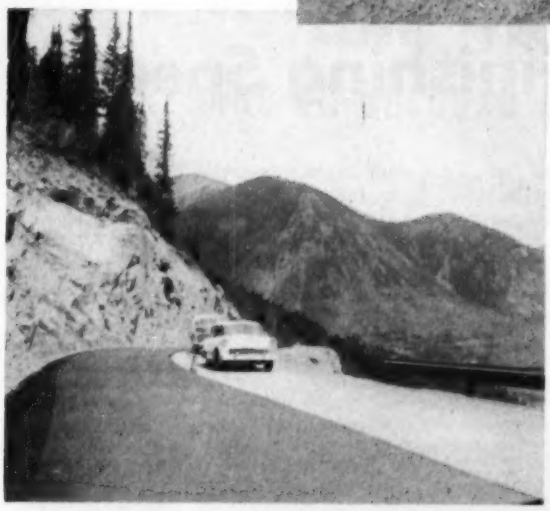


Constructing skid - resistant Texaco Asphaltic Concrete pavement on U. S. Route 550, where this highway crosses the Molas Divide in Colorado at an elevation of 10,000 feet.

CONTRACTORS

Lowdermilk Brothers Construction Company, Denver, Colo.

Sterling Sand & Gravel Company, Fort Collins, Colo.



Completed Texaco Asphaltic Concrete surface at the left and the 6-inch broken stone base at the right.

U. S. Route 550 crosses the Molas Divide near Silverton, Colo., about 10,000 feet above sea level. On the curves and grades of such a mountain highway, dependable skid-resistance is an exceptionally important quality in a pavement.

A hot-mix Texaco Asphaltic Concrete pavement has been constructed on this 6.8 mile section of US-550. Laid to a compacted thickness of two inches, this skid-resistant, rugged wearing surface is supported by a six-inch foundation of crushed stone. The Texaco asphalt surface and the stone base form a completely flexible pavement from the subgrade up, which is capable of absorbing heavy traffic year after year, with a minimum of maintenance.

Hot-mix Texaco Asphaltic Concrete is one of many heavy-duty, intermediate and low-cost types of construction for highways, streets, airports and parking areas obtainable with Texaco asphaltic products. Helpful information about the methods and materials recommended for all these types is supplied in two free booklets. Copies may be obtained without obligation from our nearest office.

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Double Your Slab Finishing Speed

WANT a lightweight straight-edge that will more than double your concrete slab-finishing speed?

Melvin-White Co. of Chicago recently developed a magnesium straight-edge that can do just that. The firm uses the tool to step up finishing of more than 750,000 sq ft of concrete slab for three transit sheds and a back-up warehouse along the shore of Lake Calumet on Chicago's far south side.

Crews Place 15,000 Sq Ft Daily

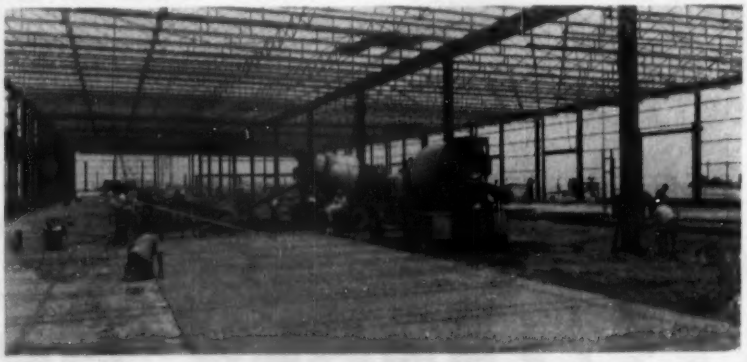
Using the new straight-edge, a small crew places daily between 12,000 and 15,000 sq ft of 9-in. slab. Using a conventional wooden straight edge the same crew could place only 6,000 sq ft a day. And savings come despite a harsh, hard-to-handle mix (2-in. slump and 2-in. aggregates) specified for the job.

The magnesium straight-edge follows the principle of conventional wooden ones; but there the resemblance ends. Melvin-White's straight edge is 21½ ft long and has two Syntron V55 vibrators mounted 5 ft, 5 in. from either end. Two handles fitted alongside the vibrators permit workmen to move the straight edge over the slab. Ropes tied around the operator's waists and connected to the straight-edge help reduce worker fatigue. Other handles fitted on the edge provide additional support. There also are adjusting screws built into the tool to insure bringing the edge into line before putting it to work.

Tool weighs only 160 lbs

Conventional straight-edges are heavy. Width of a bay that they can work efficiently is limited to

(Continued on page 163)



TOOL is so light, crews using it place between 12,000 and 15,000 sq ft of slab daily. Same crews using the heavier, conventional wooden edges placed only 6,000 sq ft daily.

LIMA Type 24 Pullshovel with 17'6" boom, 6'0" bucket arm and ½ cu. yd. bucket.

LIMA Type 24 Jobmaster
best all-purpose performer in its class

Here's a rugged, ½ yd. all-purpose machine with big machine features. Lima's modern, versatile Type 24 *Jobmaster*, a quality-built specialist in its class, has been designed to fit every one of your job needs.

The *Jobmaster* is available with gasoline, diesel or electric power. It can be equipped as a shovel, 13 ton crane, clamshell, dragline or ½ cu. yd. pullshovel with crawler, wagon or truck mountings. The front end equipment can be interchanged easily in the field.

Lima quality guarantees high output, low operating and maintenance costs with the *Jobmaster*. Why not boost your operating profits by putting it to work today. For complete details contact your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as a LIMA!
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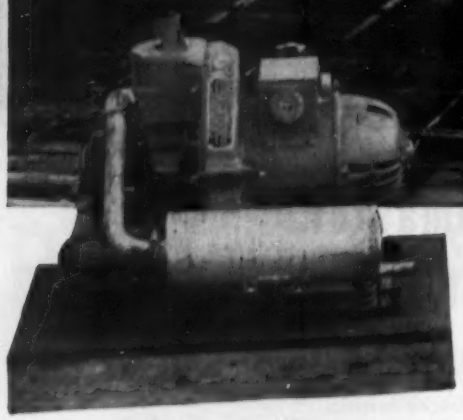

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NEW 115 VOLT AC-DC VIBRATOR

In addition to the high-cycle vibrator, Homelite also has a new 115 volt AC-DC vibrator for working concrete in small forms, reinforced concrete columns, and in other "tight spots". Weighing only 32 pounds complete, it can be carried and used anywhere by one man. It will operate from either standard, 115 volt "house" current or from a low-cost Homelite carryable generator.

Write or call your nearby HOMELITE representative today for a free demonstration.

One man can run this Homelite High-Cycle Electric Concrete Vibrator anywhere . . . to place concrete faster, easier and more profitably than ever before. That's because he handles only the lightweight vibrator head and cable. The generator stays on the ground . . . or in any convenient spot within a 400′ radius . . . out from under foot and away from pouring operations. No special cradles or scaffolds are needed.

You can handle 30 to 40 cubic yards of 2″ slump concrete per hour with this powerful Homelite vibrator. Tough, kink-proof, handling hose goes anywhere . . . around corners, over obstacles . . . can't be injured by bending. Quick-connecting extension hoses let you work effectively in the deepest forms. The rugged, high-cycle motor built into the vibrator head will give long, profitable service at lowest maintenance cost. Carryable, 125 pound, Homelite generator supplies both high-cycle current for one or two vibrators *and* 110 V. DC current for your electric tools and floodlights.

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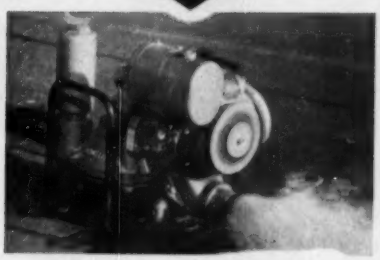

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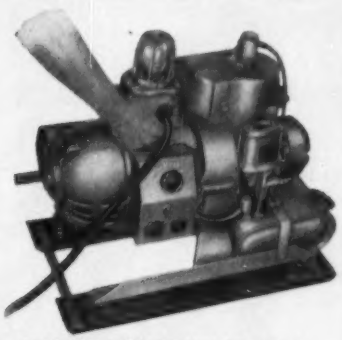

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MAGNESIUM STRAIGHTEDGE

continued from page 160

about 16 ft. The 21½ ft straightedge used by Melvin-White weighs only 160 lb. Its light weight enables the contractor to place slabs in bays as wide as 25 ft.

Despite the greater width of the bays, use of the new straight-edge eliminates the need for screeds. Designers of the tool—the firm's president, Paul White, and chief engineer, Howard Wallin—feel that even greater lengths can be made without creating weight problems.

One pass of the straight-edge imparts a positive level to the slab. Finishing consists of bullfloating the surface, hand floating, and, finally, hand trowelling after edges have been trimmed.

The new straight-edge cuts other expenses besides labor. Wooden forms are used instead of metal. The contractor creosotes 2x10's and uses them to enclose the 9-in. reinforced concrete slab specified. These 2x10's have sufficient strength and rigidity to support the straight edge. Also, the new leveler is a permanent tool. Unlike wood, it does not warp or become waterlogged.

"Wooden straight edges quickly become unusable. Often in the middle of a job," Wallin said.

Saw Cuts Joints

Another time saver used by the contractor on the job is a Felker diamond saw fitted with a green concrete blade to cut joints in concrete. Though common on road-building jobs, the saw seldom is used in industrial construction. Cutting joints with the saw permits the contractor to place a continuous slab instead of the conventional checkerboard pattern. This means a reduction in formwork.

Finishing crews saw control joints 4 to 16 hr after a 20- or 25-ft strip has been laid. Joints extend to one-third the depth of the 9-in. slab. Besides affording greater economy, sawing joints improves the quality of the work.

The sawed joints have much less tendency to spall than those formed by other methods. Use of the saw also eliminates the need for manual transportation of mix as well as half the formwork. With this method forms are laid down to enclose a continuous strip of floor from one end of the building to the other.

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	PLYFORM	HARBORITE	MATERIAL YOU NOW USE
WAREHOUSE COST PER FOOT*	$.242	$.308	
AVERAGE NUMBER OF RE-USES	10	40	
COST PER POURED SURFACE FOOT	$.0242	$.0077	

*Prices vary in different areas.

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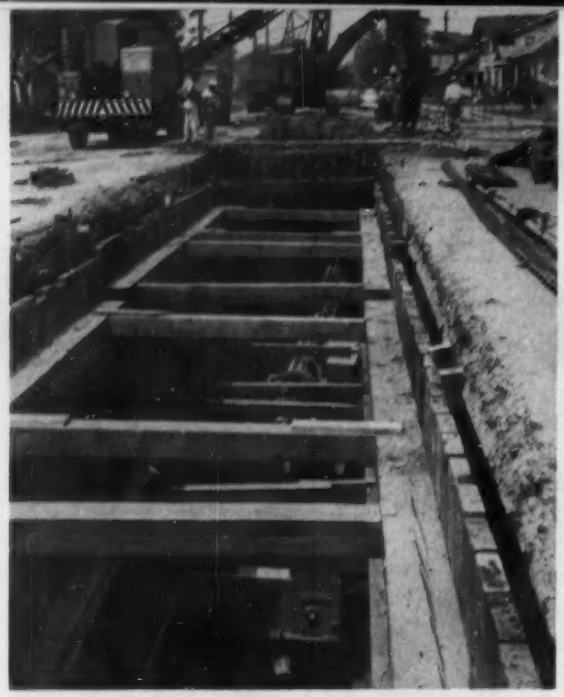


LOOSENING MUCK from utility lines, Gradall works at bottom of 26-ft deep trench. Clearance on either side is less than 1 ft.

HEAVY SHEETING protects Gradall. Previously, men had to go beyond sheeting to remove muck from around lines with air spades.

Gradall Works from Trench Bottom

GAS AND WATER MAINS were a constant headache for a California contractor excavating a trench 12 ft wide, 26 ft deep, and 6,000 ft long as part of a $1,532,000 storm drain project at Los Angeles.

Where utility lines crossed the open trench, A. Teichert & Son Inc. of Sacramento was forced to send men into the cut with air spades to loosen muck from around the lines so that it could be clammed out. Besides exposing men to the constant danger of a cave-in, this method of clearing the lines was taking so much time that it threatened the schedule for the entire job.

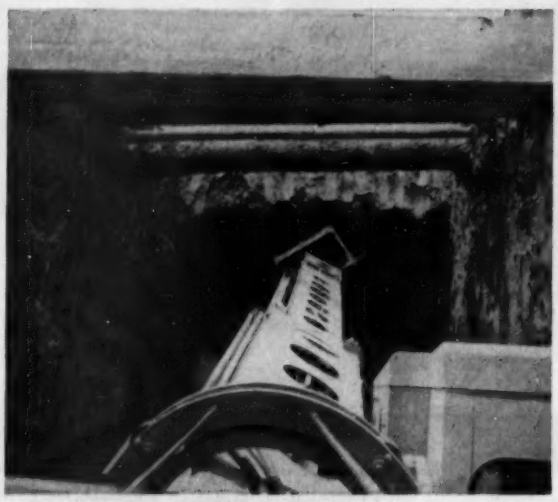
When the plans showed that five utility lines were to be encountered in a 100-ft stretch of the cut, project manager W. W. Staring decided to utilize one of Teichert's two Gradalls to loosen muck from around the lines so that it could be clammed out.

Most of the trenching was done by a Buckeye 224 trencher modified to dig the cut in one pass. To get the big trencher's boom into the cut, a 40-ft long starter hole was necessary. This starter hole was smoothed with a dozer and the Gradall was driven to the trench bottom.

The rig had less than 1 ft of clearance on either side because the distance between the sheeting that lined the cut was only 10 ft 9 in. This limited the swing of the Gradall, but by adding wings to a 3-ft excavating bucket and using a 4-ft boom extension, it was able to cut the full 12-ft width of the trench.

The Gradall worked from a section of the trench that was entirely protected with 4x8 sheeting. This meant that none of Teichert's personnel had to enter the cut beyond the sheeting.

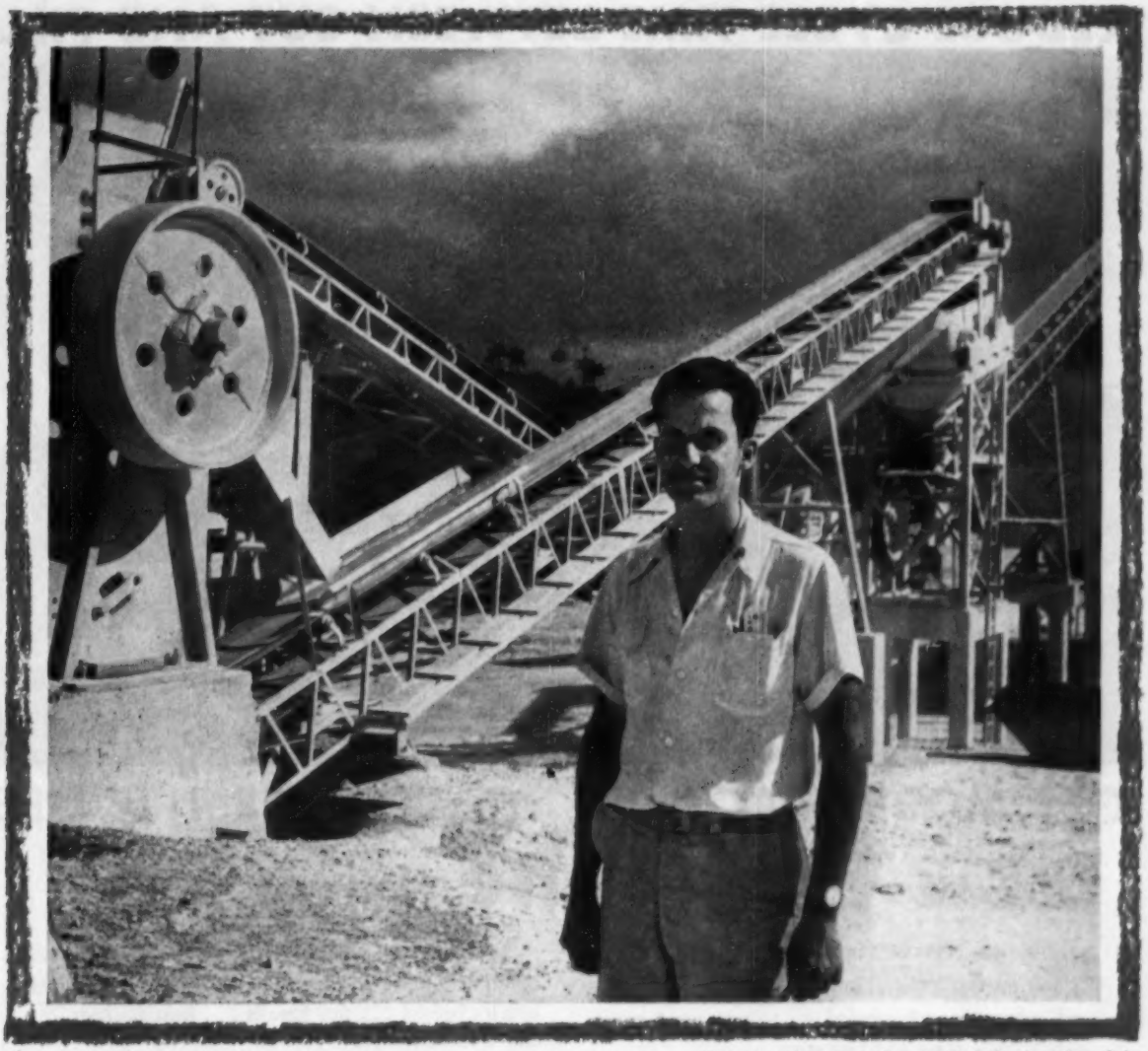
Without damaging the utility lines, the 100-ft plug was loosened and clammed out at a cost of $850. Staring compares this figure with the $1,000 it cost to remove muck from a shorter section of the cut that had only three utility line crossings.



BOOM SWING is limited, but by adding 4-ft extension and equipping 3-ft bucket with wings, full 12-ft wide cut is obtained.

The big saving was in the speed of the operation. With air-powered spades, it took 7 days to clam out 560 yd from around three utility lines. With the Gradall, 740 yd of muck were removed from around five lines in less than four days. This meant that work following the trenching was not held up.

Teichert is building the reinforced concrete box storm drain for the Los Angeles Flood Control District.



H. Amengual, engineer, Jamaica Rock Crushers, Inc., Cuba

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THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Caused It?

WHY is the United States confronted with a serious shortage of scientists and engineers?

One reason, discussed in earlier editorials in this series, is that the increasingly complex technology needed for national security and for an expanding economy has raised enormously the demand for technically trained people.

But it is clear also that too little has been done to increase the supply of scientists and engineers and to make most effective use of the limited number now available. It is with this second reason for the shortage that this editorial deals.

Too few bright young people have been attracted to careers in the sciences and engineering. Many with technical training have been leaving these professions, with the exodus from teaching being especially alarming. And the technical talent now employed in industry, government and education is, in too many instances, being utilized less effectively than it might be.

Paying for a Miscalculation

A legacy of the depression provides part of the explanation for the current shortage of young people entering scientific and engineering careers. Because of low birthrates in the 1930s, there are now about one million fewer boys and girls of college age than there were in the early 1940s. Not until 1960 will there be as many in the 18-21 age group as in 1945. And from the brightest young people of these ages must come, not only scientists and engineers, but the new members of all the professions needed by our growing economy.

A miscalculation in the late 1940s, when our future needs in various occupations were being gauged, provides another part of the explanation. Occupational counselors and high school students were advised that, because of heavy postwar enrollments in engineering and other technical fields, "it is likely that the shortages of trained men will be alleviated in a few years."*

Instead of being alleviated, however, the shortages became more acute. Job opportunities grew rapidly, while graduating classes dwindled. Fewer than half as many students received degrees in engineering in 1955 as in 1950, the peak postwar year. The trend has been reversed, but graduating classes will not be large enough to narrow the gap for several years.

Lost Talent

Beyond these temporary conditions, there is another explanation for the failure of the number of scientists and engineers to keep pace with our rising needs. This is the staggering loss between high school and college of young people with the talent to be successful in science and engineering. **Last year between 60,000 and 100,000 high school graduates of college ability failed to enroll in college for financial reasons and perhaps an additional 100,000 did not enter college because of lack of interest.†**

Of the most intelligent 20 percent in the group of college age, fewer than half enter college and only about a third graduate from college. Educational authorities estimate that fewer than 2 percent of those in the college age group who are mentally equipped to obtain Ph. D. degrees will actually obtain such degrees.

Another crucial stage is in the high

*U. S. Bureau of Labor Statistics, *Occupational Outlook Handbook* (Bulletin 940), p. 63.

†Charles C. Cole, Jr. (assistant dean, Columbia College, Columbia University), *Higher Education*, November 1955.

schools, where future scientists and engineers receive their first training in science and mathematics. There are serious weaknesses and signs of deterioration in this vital part of our educational system.

One-quarter of all American high schools offer no chemistry or physics. One-quarter offer no geometry. In many of the schools offering science and mathematics courses, the quality of instruction is low. Last year in the New York City school system alone more than 10,000 students were in science classes taught by teachers who were not trained in science.

This is a situation that threatens to become much worse. Between 1950 and 1955 the number of graduating teachers qualified to teach high school mathematics dropped 53 percent and those qualified to teach science dropped 59 percent. Furthermore, only about 60 percent of the graduates certified to teach mathematics or science in 1955 entered teaching as a career.

On the students' side — partly because of inadequate guidance programs — there has been a drift away from science and mathematics courses. The result of low student interest, and poor high school programs, in science and mathematics is virtually to foreclose careers in science and engineering to many bright young people. They miss the necessary basic training. Many who do attempt to obtain college training in these fields are ill-equipped. Engineering school deans report that fully half of their students enter with deficiencies in mathematics.

Misuse of Trained People

Scientific and engineering careers have long had a reputation for low salaries and limited opportunities for advancement. In recent years starting salaries have sky-rocketed and have been accorded wide publicity. But unfortunately there has been much less improvement in the salaries paid experienced engineers and scientists, especially in government and education. This has lowered the morale of experienced men and provided an incentive to desert engineering and research positions for higher paying jobs in sales or management.

Engineers and research scientists complain also that too much of their time now is spent on tasks that draftsmen and technicians could perform. Unfortunately for easy solution of this problem, however, there is an acute shortage of technicians as well. Worse still, there are indications that some companies in industries using large numbers of engineers have gobbled up technical manpower at a faster rate than they can effectively employ these scarce people.

Another drain on the supply of newly-trained scientists and engineers is military service. About 8,000 of this year's 27,000 engineering graduates were in ROTC programs and committed to active duty after graduation. Dr. A. W. Davison, chairman of the Engineering Manpower Commission of the Engineers Joint Council, says that in most cases no attempt is made by the Armed Services to assign these young officers to duties for which their engineering education specifically prepared them. They are not only withheld from industry and education for two years but also are not utilized in defense programs requiring more engineers and research scientists.

Some of the causes for the present shortage of scientists and engineers — bad advice a few years ago and a college age group held down by depression birthrates in the 1930s — are gradually being overcome. But others, such as the deterioration of science and mathematics training in our public schools and the many instances of ineffective utilization of scarce technical talent, enjoy no such prospect of automatic correction. The final editorial in this series will deal with some practical suggestions for meeting these problems.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

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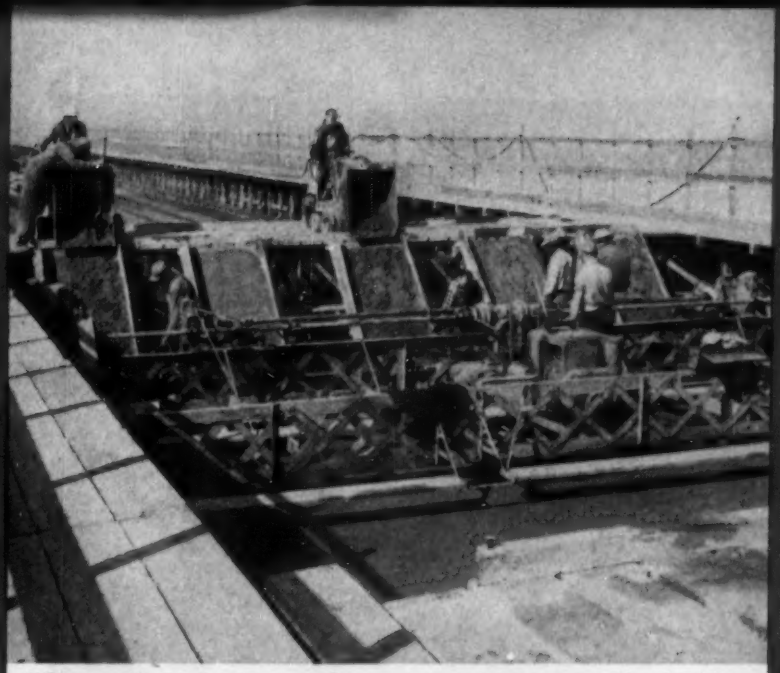


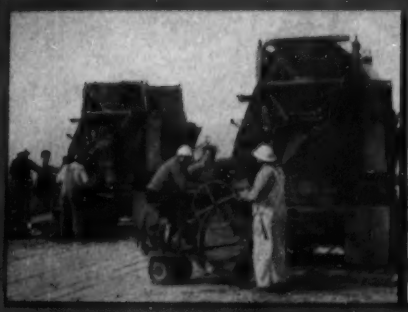
Whiteman Power Buggies speed concrete out ramp on one side of Bridge—return on opposite ramp for next load. Keep pouring operation moving at a fast pace. These photographs courtesy of Construction Illustrated.

Whiteman

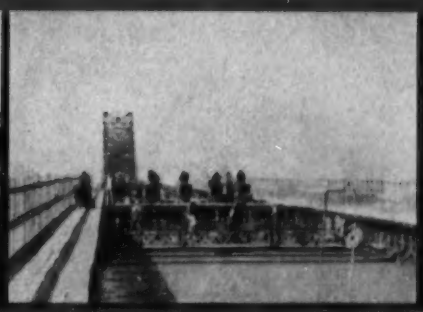
Power Buggies* make SHORT WORK of a LONG HAUL

on ¼ mile ramp on San Francisco Bridge†

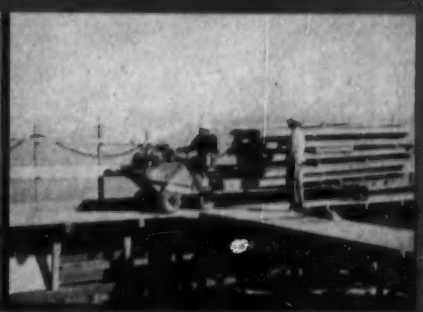
† Teamed
[illegible] Rhodes and Larkin



Whiteman Power Buggies load from truck mixers a quarter mile from pouring site.



Cross-ramps for pouring operations handle five Power Buggies at one time.



Whiteman Power Buggies haul materials too! Here a load of forms is moved to a new location.

Pouring 14,200 cu. yds. of concrete decking on the Richmond-San Rafael Bridge crossing San Francisco Bay requires carrying concrete over a ¼ mile long ramp from truck-mixer to pouring site. This long haul would have been a slow, back-breaker with hand buggies, but fast, efficient Whiteman Power Buggies placed the concrete in record time.

Whiteman Power Buggies are gluttons for work — never tire or slow down. Their versatility and performance will keep your concrete-placing operations moving on a fast schedule. You'll find Power Buggies priced to quickly pay for themselves... often on their first job. Call your Whiteman Distributor today ... or send coupon below for complete details.

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to complete the picture —
... is yours a sharp enough pencil?

Sharpen your pencils! That's the advice highway officials will give contractors and subcontractors bidding under the new federal-state highway construction program. Both Uncle Sam and his taxpaying nephews and nieces want the most for their money.

Profit attainment, therefore, becomes more than ever a question of efficient operation. In these days of high-powered machinery, Power is the big difference between efficiency and inefficiency. This explains the growing trend to Chrysler Industrial Power, the importance of Chrysler "end product-engineered" engines.

What Is A Chrysler "End Product-Engineered" Engine?

It is a complete heavy-duty power combination — engine plus accessories — each component designed and engineered *by Chrysler to* fit the end product. A complete unit, it offers end product manufacturers and users all the advantages of one-stop sales and service.

Here are some typical examples of Chrysler End Product-Engineered Engines for the construction industry:

CONCRETE MIXERS—Engine plus
- Mechanical or Velocity Governor
- Special Crankcase Ventilation System
- Heavy-Duty Air Cleaner
- gyrol Fluid Coupling
- 3, 4 or 5-Speed Transmission
- Heavy-Duty Over Center Clutch and Power Takeoff
- LPG Carburetion System

FRONT-END LOADERS—Engine plus
- Chrysler Industrial Torque Converter
- Heavy-Duty Over Center Clutch and Power Takeoff
- 3, 4 or 5-Speed Transmission
- Engine-Driven Hydraulic Pump
- LPG Carburetion System

SHOVELS, CRANES AND HOISTS—Engine plus
- Heavy-Duty Over Center Clutch and Power Takeoff
- Chrysler Industrial Torque Converter
- Mechanical Governor
- LPG Carburetion System

ROAD ROLLERS—Engine plus
- Chrysler Industrial Torque Converter With or Without Tail Shaft Governor
- gyrol Fluid Coupling
- Heavy-Duty Over Center Clutch and Power Takeoff
- 3, 4 or 5-Speed Transmission
- LPG Carburetion System

Chrysler Industrial Engines and Power Units are end product-engineered for top-profit performance. Don't let power stall your efficiency . . . make sure your equipment is powered by Chrysler . . . 230 to 413 cubic inch displacement, in-line 6 and shortstroke V-8 engines. For full particulars see a Chrysler Industrial Engine Dealer, or write: **Dept. 89, Industrial Engine Division, Chrysler Corp., Trenton, Michigan.**

CHRYSLER INDUSTRIAL ENGINES

HORSEPOWER WITH A PEDIGREE

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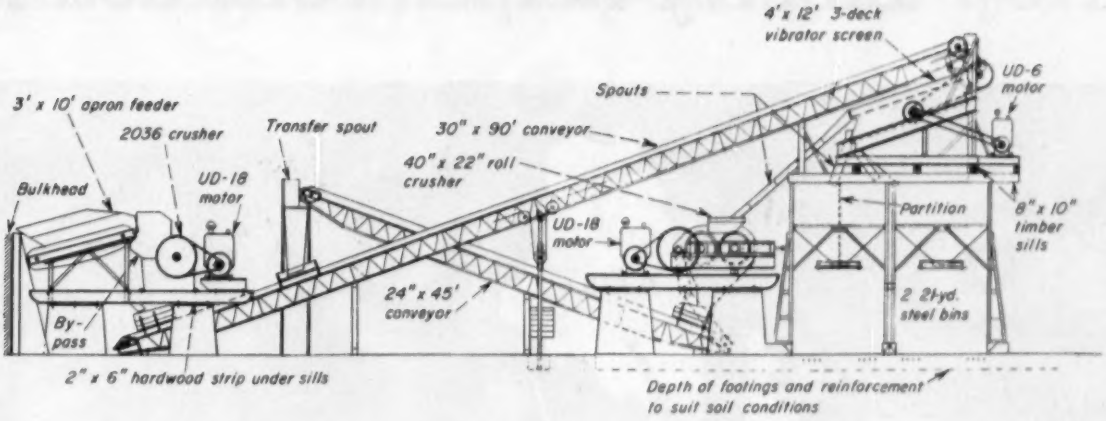
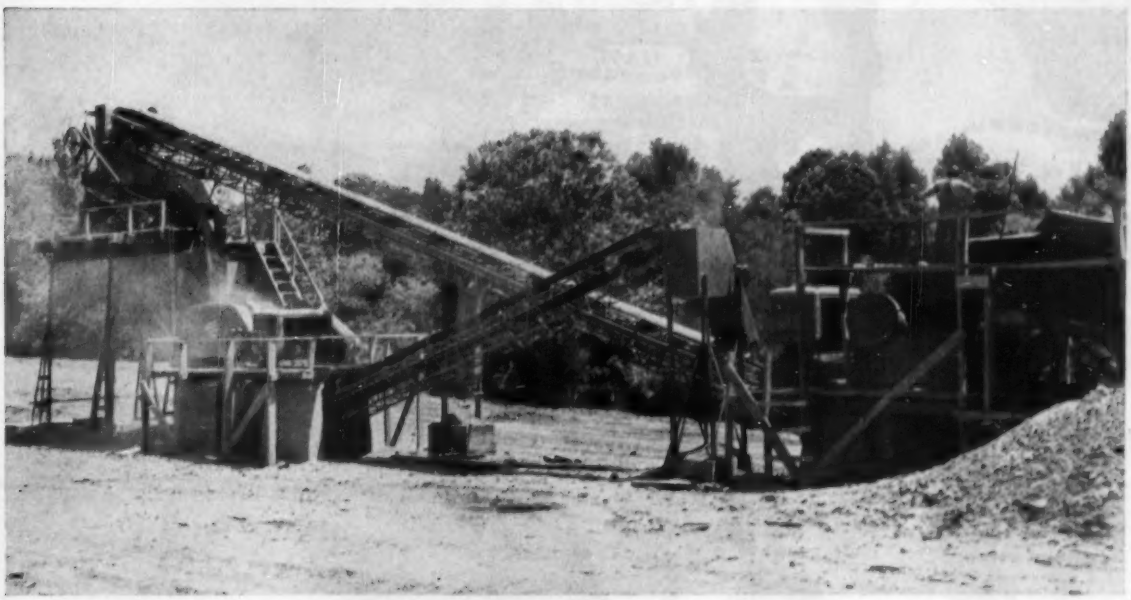
PRODUCING AGGREGATES





TYPICAL 100-TPH QUARRY PLANT includes feeder, primary crusher, sizing screen, secondary crusher, and various conveyors and bins. In sketch, apron type feeder is at left. In photo it is at right and the operator is controlling it by hand lever.

2. Feeders and Their Application

By W. A. Rundquist,
Vice President,
Pioneer Engineering Works

PRODUCTION of aggregates to meet today's tough and precise specifications generally requires a series of operations. This is so whether the source material comes from a quarry, gravel pit, or slag pile.

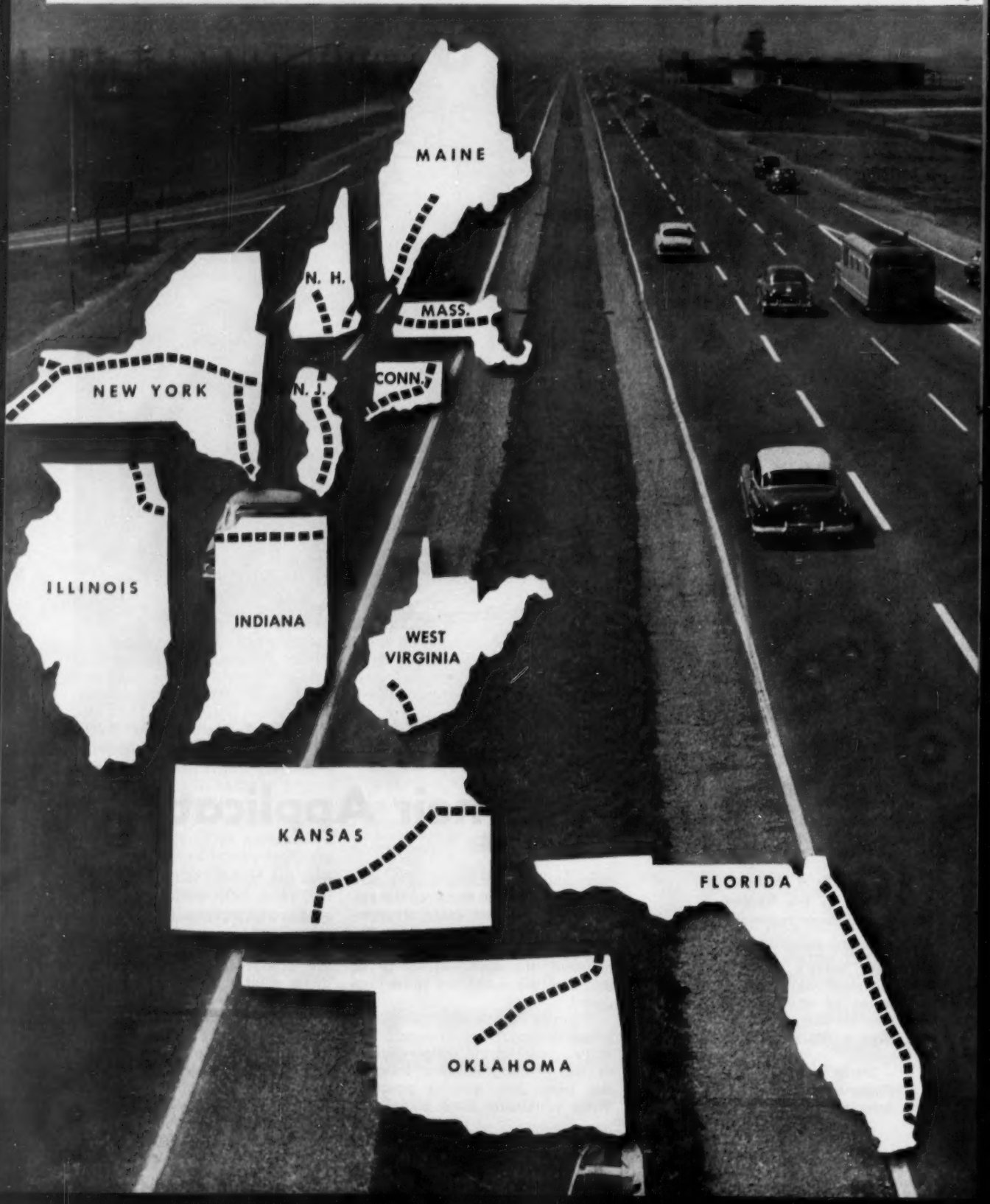
There are always one or more stages of screening or sizing to be done, most likely following one or more stages of crushing. The size of the units which make up the aggregate plant and their arrangement in the production cycle depend on the nature of the source material, the specifications to be met, and the quantities to be produced.

When producing aggregates from a quarry, the first step usually involves crushing, but scalping ahead of the primary crusher recently has come into greater practice. When producing from gravel, the first step usually is one of screening, often with some preliminary sizing, and removal of sand and other fines.

To understand how aggregates are produced, it is necessary to know what the various units are, where they are located in the cycle, how they are constructed, and how they function. Later we will show how to estimate equipment for specific purposes and how to arrange it for most efficient results.

(Continued on page 176)

How Liberty helped contractors



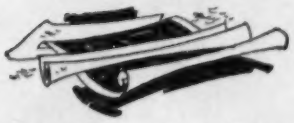
cut costs on 12 superhighways

Contractors have found that Liberty Mutual's loss prevention ideas save big money. That's why Liberty Mutual is one of the leading writers of compensation and liability insurance for highway jobs.

For instance, Liberty insured part of all 12 of the major superhighways pictured here. In each case, Liberty Mutual Loss-Prevention Engineers carefully analyzed potential hazards long before work started. As work progressed, they were constantly on the job — making test blasts; planning detours and barricades (one-quarter of all public liability cases against contractors involve public vehicles striking barricades or equipment); advising on equipment movements; and assuring good housekeeping.

Most of the accidents reported on road jobs are the result of negligence. You can see the importance of having an alert, expert team of loss prevention engineers working with you on every job. Liberty knows how to help you prevent accidents — and that means lower insurance costs, less equipment damage, fewer idle workmen, and less down-time. It pays to insure with Liberty Mutual.

10 WAYS LIBERTY MUTUAL CUTS INSURANCE COSTS ON CONSTRUCTION JOBS



1. ADVANCE ANALYSIS, by Liberty engineers, spots and controls potential hazards before each of your projects begins.

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4. AROUND-THE-CLOCK CLAIMS SERVICE — full-time claimsmen on the bigger jobs — assures fast, fair claims handling.

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For 20 straight years — the nation's largest writer of Workmen's Compensation Insurance

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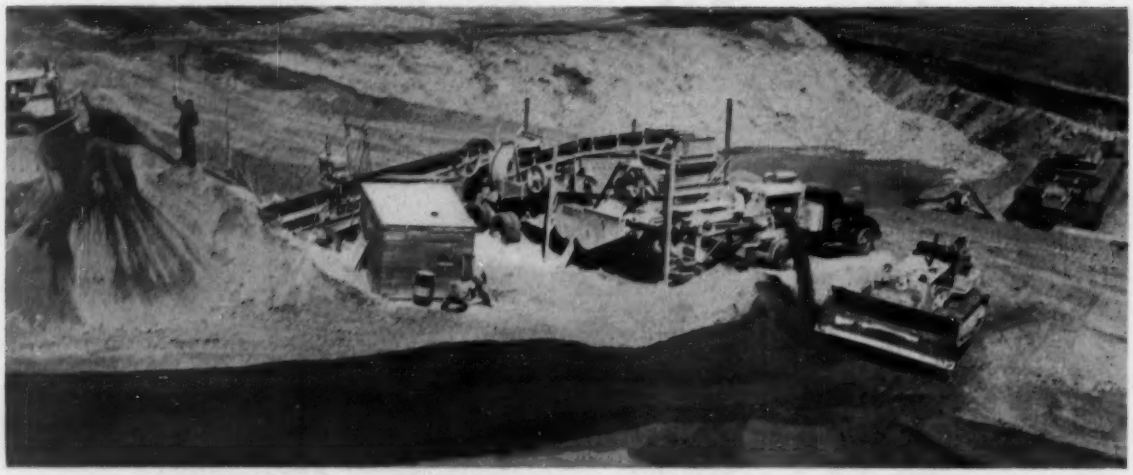


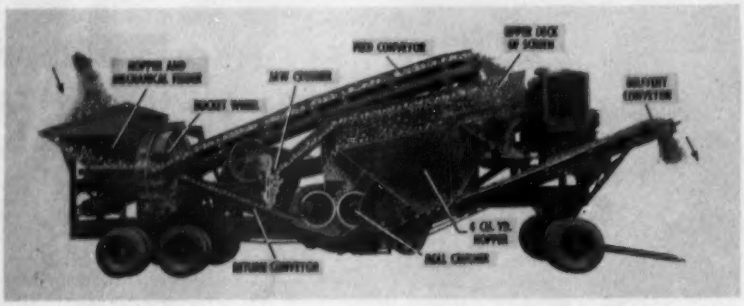
TYPICAL PORTABLE GRAVEL PLANT incorporates same basic units as quarry plant, but differs in size, type and arrangement of components. While some gravel plants will produce several sizes of material, this turns out one size and removes excess sand.

Accompanying illustrations show two typical crushing plant setups—one for a quarry operation, the other for a gravel installation.

The quarry plant will produce two or three sizes of graded aggregates. Its output may be upwards of 100 tph of approximately 1½-in. maximum material.

The type of gravel plant shown is for producing one size of aggregate, with the removal of excess sand. (Gravel plants need not be confined to the production of one size of material, however. As with quarry plants, they can readily be designed to produce several sizes of aggregates.)

Note that both types of plants incorporate similar units. Each has (1) a feeder, (2) primary crusher, (3) secondary or reduction crusher, (4) screening unit, and (5) the necessary conveyors for routing the material in proper sequence. Differences between these two plants are (a) the arrangement of the component units and (b) variations in the units to adapt them to the characteristics of the source materials.



First, Proper Feeding

In both plants, the first unit is the feeder. This is where plant operation begins. Probably no other single factor in the design or construction of an aggregate processing plant costs so little and pays so much in dividends as proper feeding. The way material is first handled at the plant often determines the efficiency of the whole series of processing operations.

While there are many types of bulk materials feeders, two are more popular than any others in the production of aggregates from quarries and pits. These are:

1. The apron feeder—primarily for quarry rock, though sometimes used for gravel.

2. The mechanical or reciprocating plate feeder — primarily for gravel, though sometimes used for rock.

Generally, the size of the material to be handled is one of the most important factors determining the feeding equipment to be used and how it should be operated. Geographical locations and types of materials are also factors, although not as important.

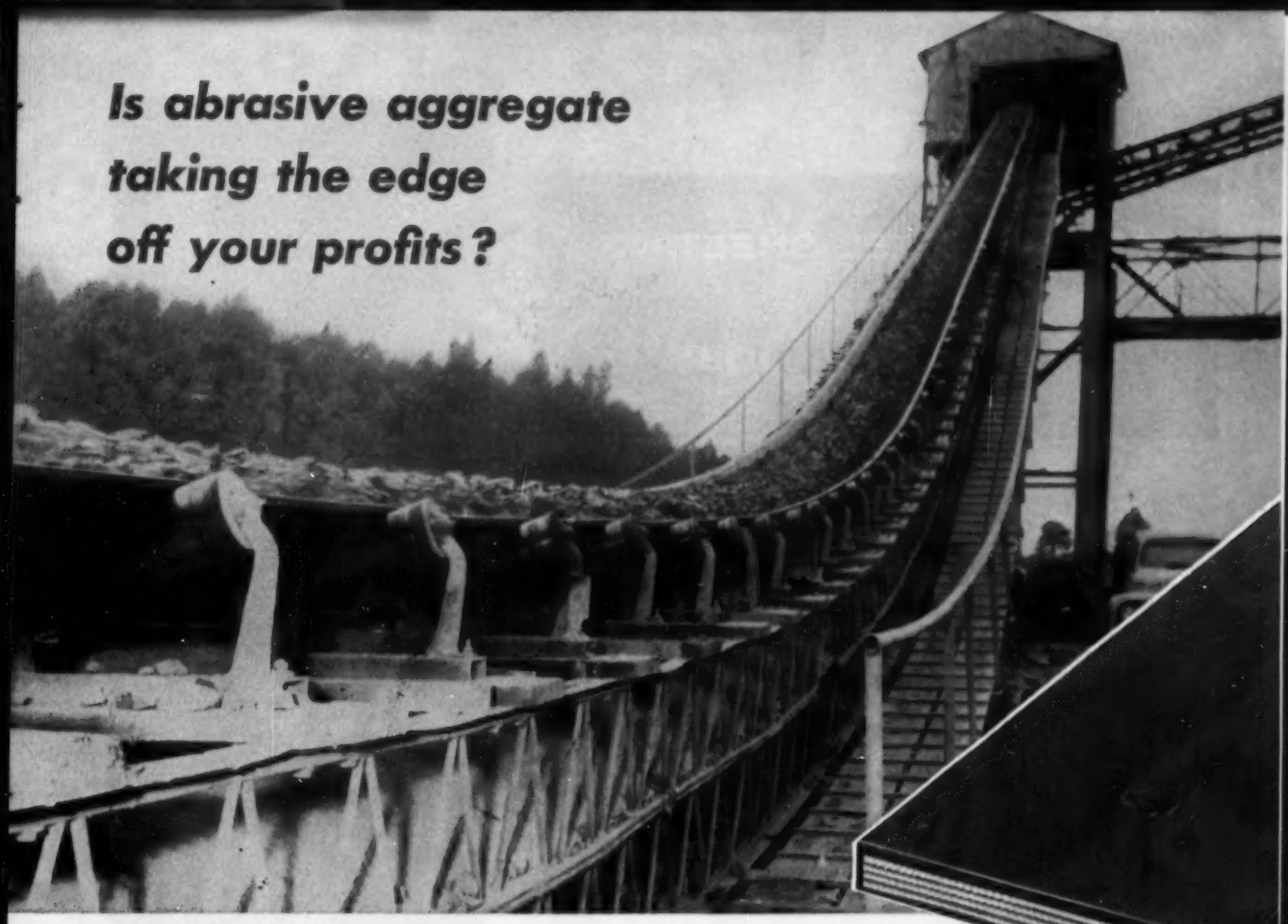
Feeding Coarse Materials

Coarse materials from a pit or quarry may range from 1 cu ft to 1 cu yd, or larger, in maximum size of lump. Usually, quarry blasting produces a mixture of rocks graduated uniformly from the largest size down to dust. Large lumps mixed with smaller pieces calls for personal skill in governing the feeding operation so that the crusher, screen, or other apparatus can be fed constantly at its proper capacity without stoppage of material and without damage to the machinery. A continuous, unsupervised system is impracticable.

This means that whatever type of mechanical feeding equipment is selected, it must incorporate a hand-controlled, easily operated starting and stopping mechanism. It is quite satisfactory to factory-equip these feeding devices with a clutch or switch for starting or stopping, unless the contractor wants to provide his own. For feeding coarse materials there are very heavy lines of apron feeders, making it possible to select the proper feeder for handling materials up to the largest size loaded out by the shovels.

Whichever type of feeder is selected, it must be located properly with regard to the crusher, screen, or other equipment it will feed. With a jaw crusher, the feeder must be set back far enough so that rocks will not be pinched between the moving jaw, or pitman, and the feeder apron or reciprocating plate.

(Continued on page 179)



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Sandstone, limestone, quartz rock and other abrasive materials make short work of conveyor belting that's not engineered for the job. You can avoid unnecessary downtime and belt replacement with properly selected Thermoid Conveyor Belting.

There's a Thermoid Belt for every type of handling—in long, continuous plant operation or portable equipment work. And because they're specifically designed for the job, Thermoid Belts last longer—save you money!

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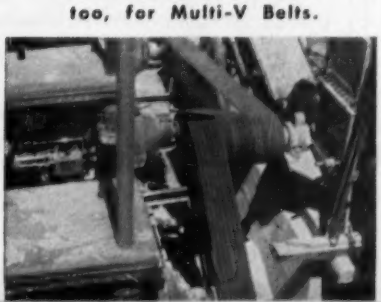

...and Hose manufactured with your needs in mind.

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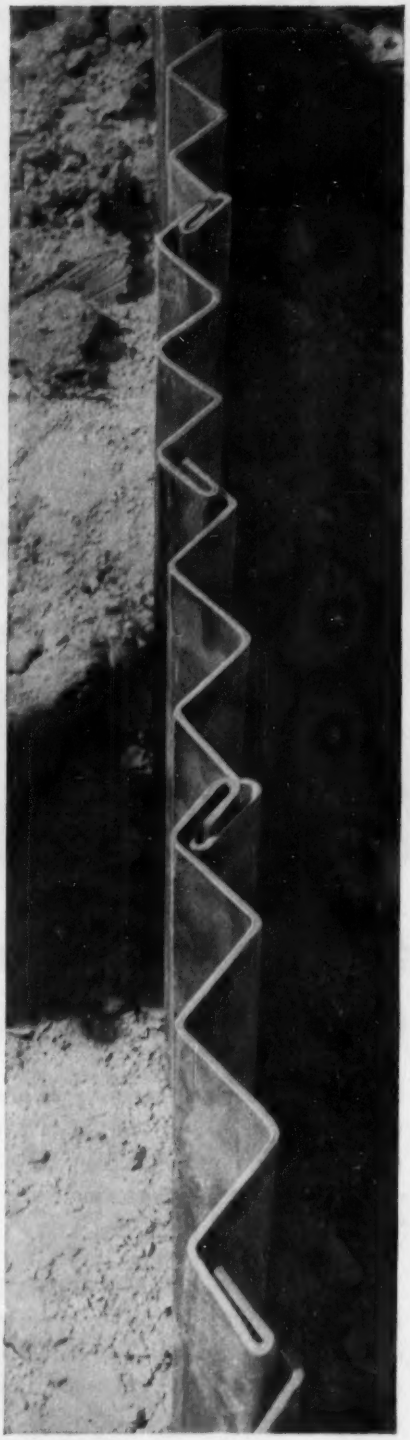
ARMCO STEEL SHEETING SIMPLIFIES CONSTRUCTION JOBS

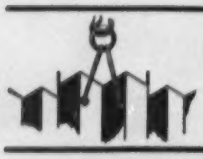


Practically every construction job involves some problem in controlling the movement of soil or water. And many of them can be solved—easily, quickly and economically—with Armco Steel Sheeting. Here are the advantages you get with the reasons for them.

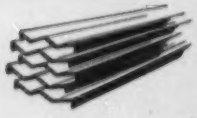
STRONG, LIGHTWEIGHT Because Armco Sheeting combines the advantages of durable metal and corrugated design you get a high strength/weight ratio.

EASY TO HANDLE Because of its light weight, one man can easily carry and handle a section of Armco Sheeting. And they nest compactly in storage.

EASY TO DRIVE Because of its small displacement area, it's usually possible to drive Armco Sheeting with hand maul or small driving equipment.



SALVABLE Because Armco Sheeting is strong and straight, it can be used again and again as a construction tool. Convenient hole makes pulling easy.



ECONOMICAL Because Armco Sheeting can be used over and over in all types of temporary jobs, unit costs drop lower with each re-use.

There are two types of Armco Sheeting: Interlocking and Flange. Principal difference is that Interlocking is used where practical watertightness is required. Both are supplied in a range of gages and in lengths up to 20 feet. Write for data. Armco Drainage & Metal Products, Inc., 4935 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

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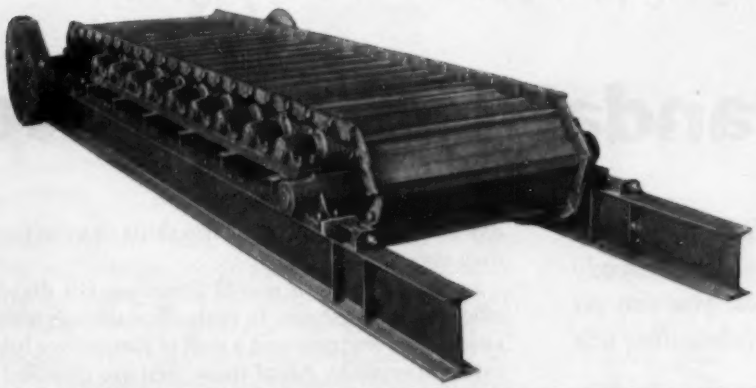

APRON FEEDER for extra heavy duty can well handle shock loads of abrasive rock.

PRODUCING AGGREGATES . . .
continued from page 176

Feeder speed must be great enough so the unit will be idle 25% to 35% of the time. In other words, the feeder should have 25% to 35% greater capacity than the crusher. Then it can be regulated to insure a load in the crusher neither too heavy nor too light but just right for maximum efficiency.

The hopper over the feeder should have a ramp so that dump trucks or cars will empty into the receiving end of the feeder rather than from the side. Further, the feeder should be long enough so the whole dump-load can be taken without material spilling over into the crusher chamber.

The feeder operator must regulate the feeder for continuous operation of the primary crusher and other processing machinery. He should have authority to direct the dumping of trucks into the feeder hopper and should have sole charge of the feeding operation. He should make sure that a cushion of material always remains in the feeder for its protection from impact by large rocks dumped from a high point of the truck, cars, or shovels.

Bear in mind that with a jaw crusher, actual crushing takes place only between the stationary and the moving jaw. No amount of material fed into the crusher above the top of the crushing jaws has any beneficial effect on output. The operator, therefore, should see that the crusher jaws never run empty and that no large rocks are fed to the crusher when material already in it will prevent the large rock from entering between the jaws.

Bridging of rocks over the crusher opening, in almost all cases, is caused by neglecting to prepare for entry of the large rocks into the crusher. When an extra large rock progresses on the feeder toward the crusher, the operator should stop the feeder until the jaw crusher is all but empty. He should then start the feeder, dropping the large rock into the crusher opening.

When that is done, elongated rocks fall into the jaws, end first. On the other hand, if the operator feeds a large rock on top of materials that already have filled the opening between the jaws, chances are that the large rock will move

(Continued on page 182)

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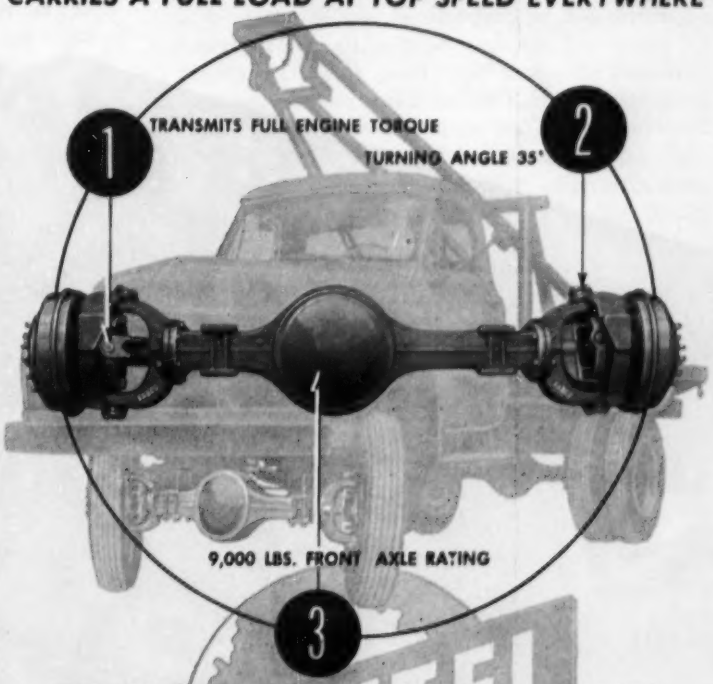
"CARRIES A FULL LOAD AT TOP SPEED EVERYWHERE"



BECHTEL CORPORATION is operating FABCO FRONT WHEEL DRIVES on their rugged Pipe Line contracts—

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Cold facts about buying fuels, motor oils and greases

Why Standard Oil can serve

Got a construction job in the Midwest or Rocky Mountain states? Bidding on one? Already working a job? Then read how you can get better service and better fuels, lubricating oils and greases.

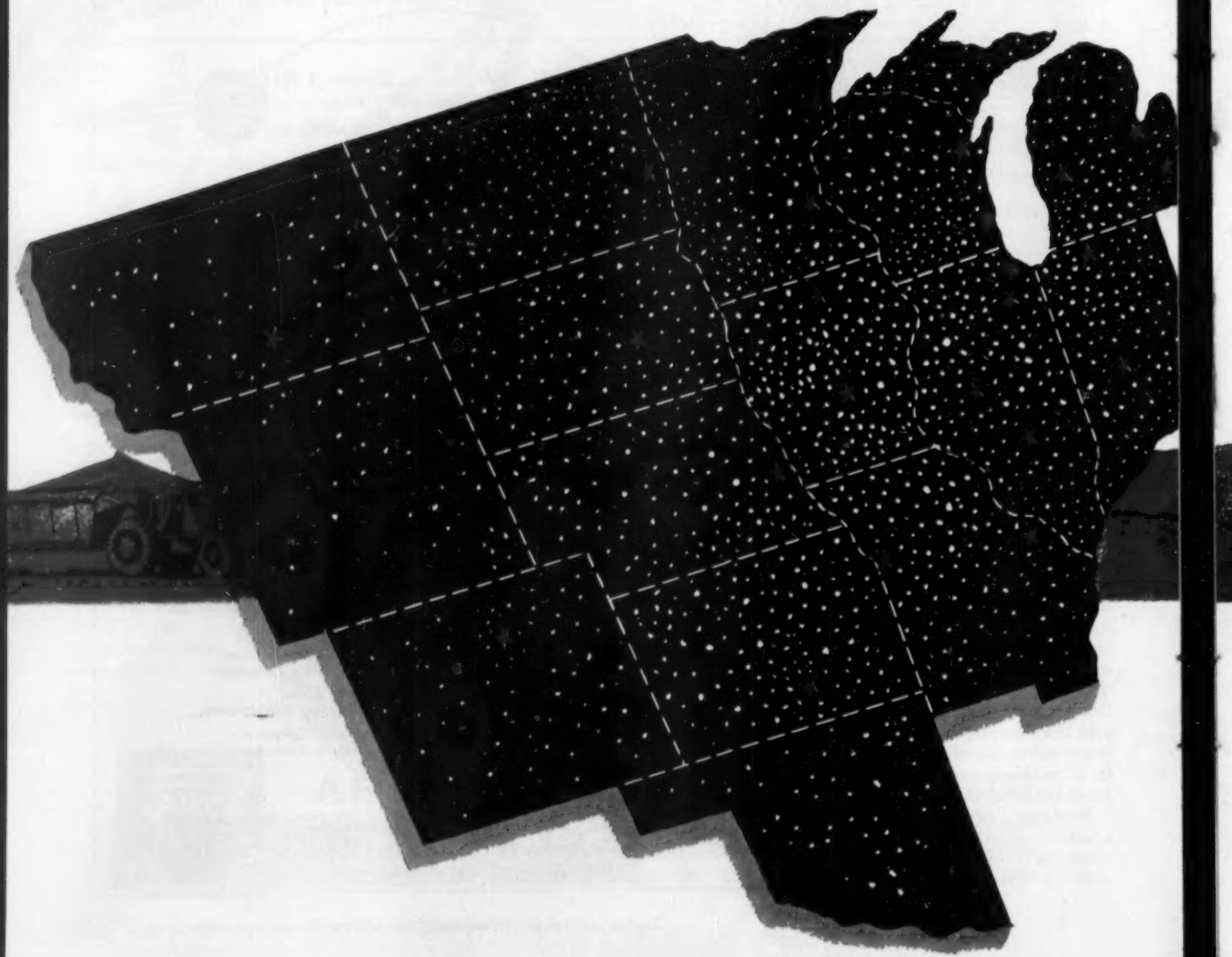
How you get service on the job.

In the 15 Midwest and Rocky Mountain states there are more than 3,900 Standard Oil bulk plants. With this many plants, none can be more than a few miles from your job no matter where it is. Experienced men work out of these bulk plants to see that you get on-the-spot service. They see that you are supplied day and night. If you work two shifts or even three, they may too.

In addition, there are 23 Standard Oil division offices in the 15 states. In each office there is a chief automotive engineer and a staff of automotive lubrication specialists. All of these men are qualified to give technical service. Most of the men have engineering degrees. They have received extensive training in Standard Oil's own Automotive Sales Engineering School. *All of these men are* Standard Oil *employees.*

The kind of service you get from STANDARD.

Automotive lubrication specialists from Standard division offices will survey your equipment and



you better

recommend the fuels, motor oils, greases to use. They will help you set up a preventive maintenance program and suggest lubrication schedules. They will back this up with service from the Standard Oil bulk station so that your equipment is *never* idle for lack of petroleum products. Through them you have a direct line to Standard Oil headquarters and laboratory for additional help.

Why STANDARD OIL products are tops for construction equipment.

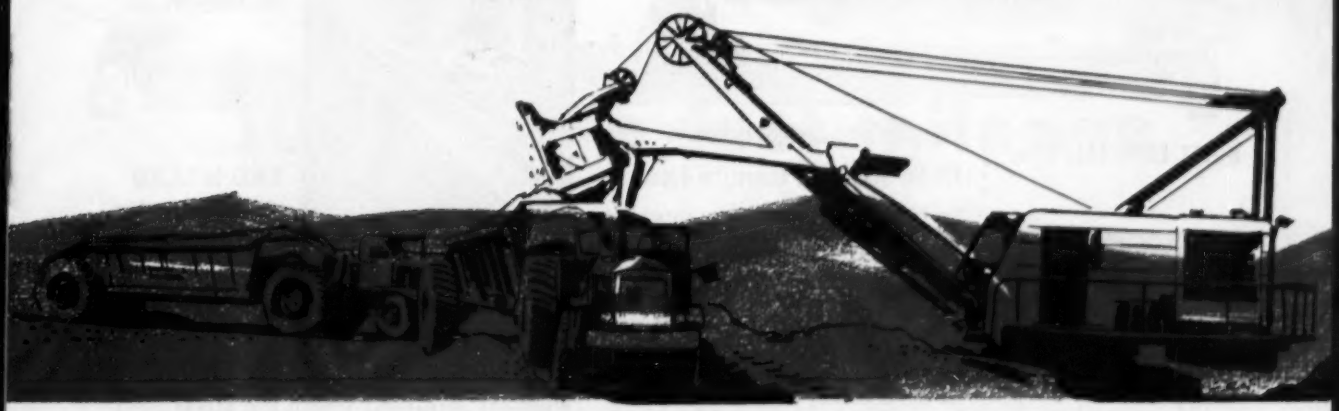
Standard Oil lubricants, fuels and greases are approved by equipment manufacturers. But there's more to it than just that. Most big equipment manufacturers' plants are right here in the Standard Oil territory. Standard works closely with these manufacturers, knows what's needed of the fuels, motor oils and greases used in construction equipment. Standard Oil fuels, lubricants and greases are used by many manufacturers in initial fills and lubrication. All products equal or exceed specifications of the manufacturer. They will stand up to any job you give them with plenty to spare.

Refinery to you, it's all STANDARD.

All Standard Oil fuels, lubricating oils and greases are made by Standard and delivered to you by Standard Oil employees with Standard's own distribution system. Everywhere you go in the Midwest and Rocky Mountain states there is a *Standard Oil* owned and operated bulk plant within a few miles. You deal with one company. Every Standard Oil supply point is equally and uniformly well run.

How to get in touch.

Because Standard Oil lubrication specialists so thoroughly cover their territory, you can depend upon meeting your man at any important contract letting —if you haven't already met him. If you miss him, look in the telephone directory of any town—no matter how small—nearest your job. You'll find the Standard Oil bulk plant listed under the Standard Oil name. If you still miss, sit tight, the Standard Oil man will be around to see you *before* you need him and he will be ready to serve you starting right then. If you would like more information right now, write or call Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



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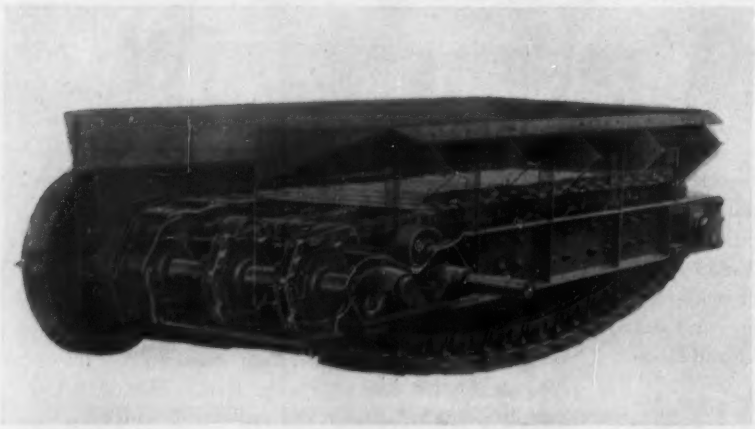
Indiana	Missouri	S. Dakota
Iowa	Montana	Wisconsin
Kansas	Nebraska	Wyoming

STANDARD

STANDARD OIL COMPANY (Indiana)



APRON FEEDER for lighter duty is fitted with forged steel, rather than cast manganese steel pans. This one is fitted with sloping sideboards, and gussets for hopper support.

downward in a horizontal position and bridge itself across the opening. Then all operations must stop while the rock is loosened or broken by manual or mechanical means.

Feeding Graded Materials

Graded materials include processed and unprocessed aggregates which either have been screened through a sieve of moderate size (3-in. square or less) or in their natural state have approximately the same characteristics as screened materials of that maximum size.

Feeding such materials is much simpler than feeding coarse materials. Reciprocating and apron feeders, when handling graded materials, usually are operated at constant speed and with a constant gate opening either to or from the feeder. It is simple, therefore, to secure the desired volume of feed.

Having selected a certain operating speed for the feeder, the operator adjusts the feeder gate opening until he secures the volume of materials required for plant balance. Where feeders must be synchronized with other apparatus to give definite proportions of materials, tables are provided to show definite speed of pan travel or rpm and definite gate openings to achieve those proportions.

With both reciprocating plate and apron feeders, there is a small lag between the theoretical capacity and the actual capacity. This lag, however, has been carefully computed and accounted for in all tables furnished for setting and calibrating feeders. With the help of such tables, graded materials can be fed with surprisingly great accuracy.

Feeding Mixed Materials

Frequently a construction aggregate processing operation calls

New TELESCOPING VIBRATORY SCREED

ITS SHOE-PLATE NEVER RIDES THE FORMS

Pats. Applied For

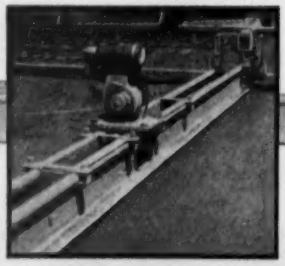
BUILT ESPECIALLY for

Overpass and Bridge Roadways

Tilt-Up Slabs and Industrial Floors

The Cmetco Telescoping Vibratory Screed is a radically new piece of cement finishing equipment. It has been engineered to economically solve many of the problems confronting the larger contractors. Costs per cubic yard per man-hour are appreciably reduced. Cost for screeding equipment is less. Better depth compaction is another valuable feature.

Due to its fast telescoping feature it avoids the cost of auxiliary beams. Because it has no beam overhang it can be operated close to existing walls. Forms are protected because the telescoping feature adjusts shoe-plate length to form widths; to fractions of inches if necessary.



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- HANDLES MORE CUBIC YARDS PER MAN-HOUR
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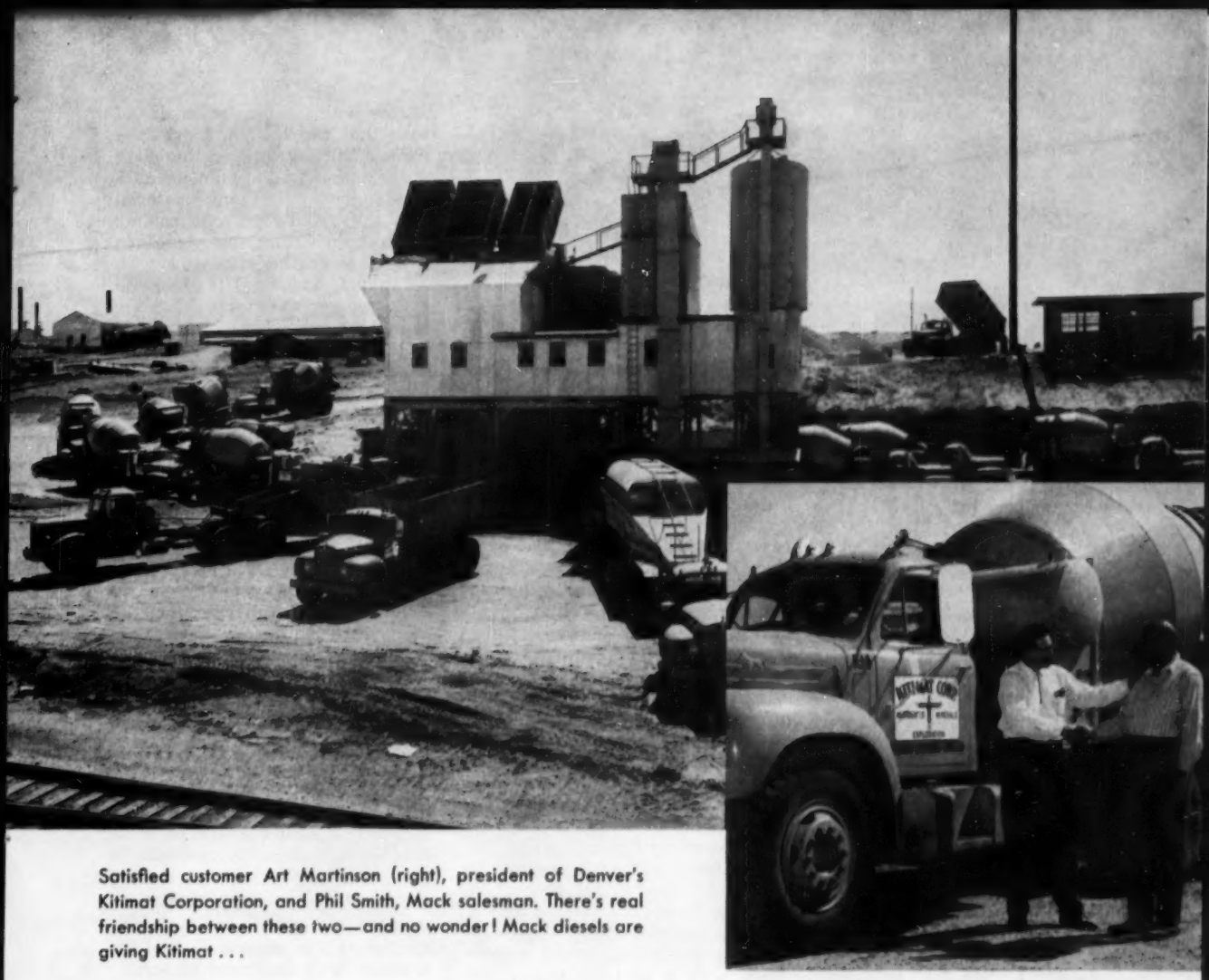

Satisfied customer Art Martinson (right), president of Denver's Kitimat Corporation, and Phil Smith, Mack salesman. There's real friendship between these two—and no wonder! Mack diesels are giving Kitimat . . .

100% more fuel mileage

The Martinson Construction Company of Denver, Colorado, leases a fleet of trucks from the Kitimat Corporation. Originally, the trucks were gasoline-powered units averaging 3½ to 4 miles per gallon—real "profit killers." Today, Kitimat operates Mack diesels exclusively and averages 8 miles per gallon—for a saving in fuel costs of more than 100%.

As Kitimat president Art Martinson says, "In 1952 we bought our first Mack diesel and got a real lesson in truck economy and performance. Today, we are 100% Mack—12 mixers, 6 dumpers, and 2 tractors. The fuel savings alone more than justify the higher initial cost of the Macks. Just as important, our Macks give us dependable service, bonus capacities, and lower maintenance costs with a really gratifying minimum of down time."

Why not cut hauling costs and boost your profits with Macks—trucks that are unmatched for operating economy, stamina, and low maintenance? Like other operators, you'll find that you can't afford *not* to operate Macks. For complete information, contact your local Mack Branch or Distributor. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

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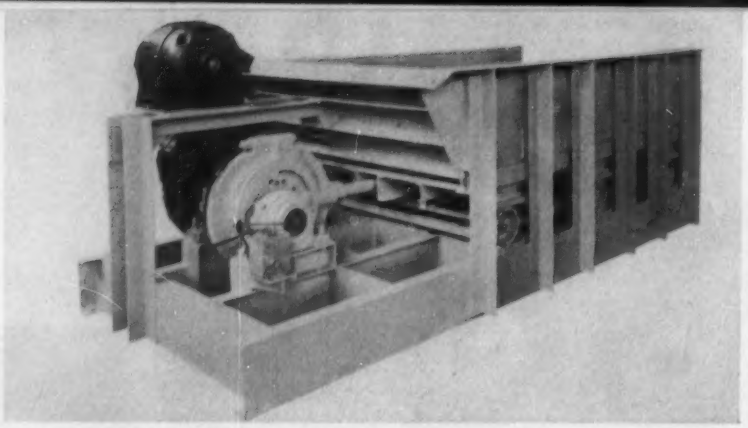


RECIPROCATING FEEDER steadily supplies mixed material to a portable gravel plant. When the gravel contains many large rocks, an apron feeder might be found more suitable.

PRODUCING AGGREGATES . . .

continued from page 182

for feeding a mixture of fine and coarse materials. Often a large proportion of material from a gravel pit will pass a 3-in. sieve, yet varying proportions will consist of occasional very large stones. The frequency of the latter determines the setup of the feeding mechanism and its method of operation.

In many operations of this sort, a standard reciprocating plate feeder equipped with a spring-retained or weighted gate will feed the materials uniformly enough to suit subsequent processing operations. It is the function of the gate to limit the volume of the finer or graded materials while at the same time yielding sufficiently to permit passage of extremely large rocks at intervals.

In setting the gate opening, it is necessary to know the size of the largest stones that are expected to pass through. Normally, the gate should open from 2 to 2½ times as high as these maximum lumps. Allowing an opening that great prevents two large lumps wedging themselves in the opening, thereby stopping all operations.

If the proportion of large rocks in gravel is very high, consider use of an apron feeder and provide stopping and starting equipment as for coarse materials. In that case, the labor cost for a man constantly at the controls would be far less than the cost of stoppages of the entire plant operation while attempting to feed a high proportion of large lumps on a continuous, constant-speed basis.

When producing gravel aggregates with a portable plant, the screen arrangement and size of jaw crusher limit the maximum size of stone that can be fed. Most such plants employ a reciprocating plate feeder, either on the plant or on a field conveyor bringing material from the pit. To prevent feeding stones larger than the plant can handle, a grating (usually with rectangular openings) is placed on a slope over the feeder hopper. Stones too large for the plant roll off the grate by themselves, or can be readily rolled off manually with a hook or bar. A common grate opening is 6x8 in.

In quarry operations it is common practice to feed materials over a scalping screen or some form of grizzly before it enters the primary crusher. Then most of the smaller material, which does not require primary crushing, will by-pass the primary and permit the crusher to utilize its full capacity for the larger material.

This practice is becoming increasingly prevalent in gravel pit operations, too, particularly where small-boulder pits have become depleted and it is necessary to crush the larger boulders formerly wasted or cast aside. Putting a large primary breaker or crusher ahead of a standard type of portable gravel plant is common in many areas. Many stationary gravel plants also are fitted with primary breakers. In such instances, it is customary to feed the primary with an apron feeder.

(Continued on page 187)

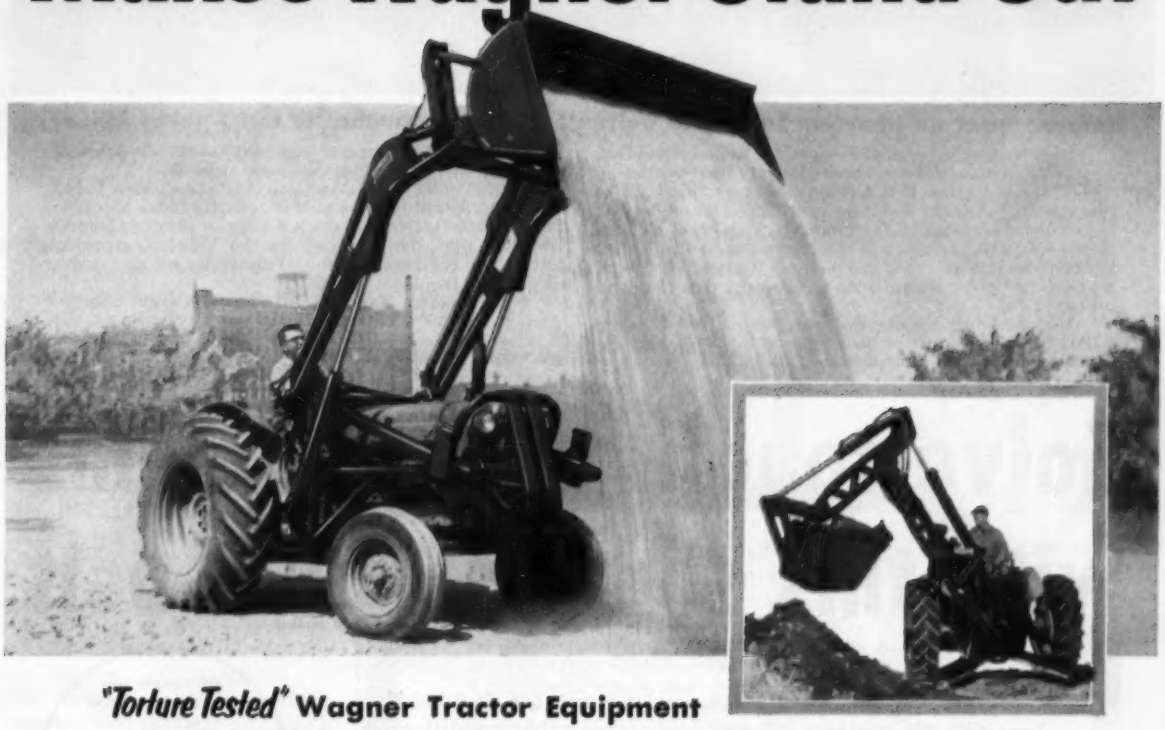
Specifications for Coarse Aggregate for Highway Construction — ASTM Designation D 448-54

Amounts Finer Than Each Laboratory Sieve (Square Openings), Percent by Weight

Size Number	Nominal Size, Square Openings	4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4 (4760-micron)	No. 8 (2380-micron)	No. 16 (1190-micron)	No. 50 (297-micron)	No. 100 (149-micron)
1....	3½ to 1½ in.....	100	90 to 100	...	25 to 60	...	0 to 15	...	0 to 5	...	...	...	...	...	...	...
2....	2½ to 1½ in.....	...	...	100	90 to 100	35 to 70	0 to 15	...	0 to 5	...	...	...	...	...	...	...
24....	2½ to ¾ in.....	...	...	100	90 to 100	...	25 to 60	...	0 to 10	0 to 5	...	...	...	...	...	...
3....	2 to 1 in.....	...	...	...	100	90 to 100	35 to 70	0 to 15	...	0 to 5	...	...	...	...	...	...
357....	2 in. to No. 4.....	...	...	...	100	95 to 100	...	35 to 70	...	10 to 30	...	0 to 5	...	...	...	...
4....	1½ to ⅜ in.....	...	...	...	...	100	90 to 100	20 to 55	0 to 15	...	0 to 5	...	...	...	...	...
467....	1½ in. to No. 4.....	...	...	...	...	100	95 to 100	...	35 to 70	...	10 to 30	0 to 5	...	...	...	...
5....	1 to ½ in.....	...	...	...	...	...	100	90 to 100	20 to 55	0 to 10	0 to 5	...	...	...	...	...
56....	1 to ⅜ in.....	...	...	...	...	...	100	90 to 100	40 to 75	15 to 35	0 to 15	0 to 5	...	...	...	...
57....	1 in. to No. 4.....	...	...	...	...	...	100	95 to 100	...	25 to 60	...	0 to 10	0 to 5	...	...	...
6....	¾ to ⅜ in.....	...	...	...	...	...	...	100	90 to 100	20 to 55	0 to 15	0 to 5	...	...	...	...
67....	⅜ in. to No. 4.....	...	...	...	...	...	...	100	90 to 100	...	20 to 55	0 to 10	0 to 5	...	...	...
68....	⅜ in. to No. 8.....	...	...	...	...	...	...	100	90 to 100	...	30 to 65	5 to 25	0 to 10	0 to 5	...	...
7....	½ in. to No. 4.....	...	...	...	...	...	...	...	100	90 to 100	40 to 70	0 to 15	0 to 5	...	...	...
78....	½ in. to No. 8.....	...	...	...	...	...	...	...	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	...	...
8....	⅜ in. to No. 8.....	...	...	...	...	...	...	...	...	100	85 to 100	10 to 30	0 to 10	0 to 5	...	...
89....	⅜ in. to No. 16....	...	...	...	...	...	...	...	...	100	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5	...
9....	No. 4 to No. 16....	...	...	...	...	...	...	...	...	...	100	85 to 100	10 to 40	0 to 10	0 to 5	...
10....	No. 4 to 0*.....	...	...	...	...	...	...	...	...		100	85 to 100	...	...	...	10 to 30

*Screenings.

Ruggedness Built In Makes Wagner Stand Out



"Torture Tested" Wagner Tractor Equipment

Gives Longer Life—Reduces Down-Time and Repair Cost

Rugged work requires rugged equipment and that's exactly what you get with Wagner "Torture Tested" tractor equipment. Every stress point is *doubly* protected. Heavy-duty construction keeps maintenance costs way down and productive time way up. Wagner equipment stays on the job day in and day out working for you and more profits. No wonder Wagner tractor equipment is recognized as so far superior it has become No. 1 in America by a wide, wide margin. See all the rugged features of Wagner tractor equipment and the numerous attachments that can make a tractor your most versatile piece of equipment. Get proven dependability no matter how tough the job. Get Wagner tractor equipment today.

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"WAGNER BUILT" MEANS "BETTER BUILT" FOR OVER 105 YEARS

Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make, It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast . . . if heavy shock loads . . . oil and heat . . . or other conditions are causing too frequent replacement . . . here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*

The Mark of Gates *Specialized Research*

TPA 104

Gates SUPER VULCO ROPE Drives

RECIPROCATING FEEDER steadily supplies mixed material to a portable gravel plant. When the gravel contains many large rocks, an apron feeder might be more suitable.

Apron Feeders

A typical apron feeder designed especially for extra heavy duty service is equipped with alloyed manganese steel pans which are interlocked and overlapping with a corrugated surface effect. The pans are driven on the under side by chain links cast as part of the pan. In some apron feeders, the driving chains are bolted or riveted to the manganese steel pans.

Sprockets on a head-shaft drive the pan chains, and at the tail end these chains turn on idler wheels. Manganese steel rollers support the pans at close, even intervals along the full length of the feeder. Such feeders are available in widths from 30- to 96-in. or more, in lengths from possibly 6 to 75 ft. Apron feeders designed for less severe applications are similar to the manganese steel feeder, but the structural features are not as heavy. This type feeder probably will have forged steel pans anywhere from ⅜ to ½ in. thick, bolted or riveted to some standard make of roller chain. In some instances, cast steel pans are used instead of forged steel pans. Feeders of this type normally are available in widths from 24 to 48 in. and in lengths from 6 to 14 ft.

When used for primary applications, apron feeders are equipped with large hoppers having sloping sides and rear to accommodate large dump loads. Frequently, especially under bins or stockpiles, apron feeders are fitted with straight side-boards.

Output of an apron feeder is controlled by an adjustable gate and by varying the rate of pan travel. Normally, no gate is used when feeding a primary breaker.

Reciprocating Plate Feeders

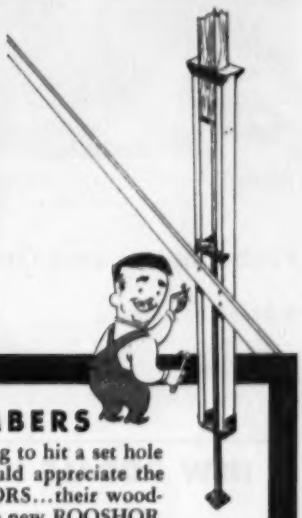
Reciprocating plate feeders have a heavy-gage steel plate in the bottom which is moved back and forth by an eccentric at the rear of the feeder. In some types, this stroke is adjustable for length; in others it is not. Further, in some feeders the speed of the stroke can be varied or changed by different sprocket combinations. By varying the stroke and gate setting, volume of feed can be closely controlled.

Continued on next page

when shoring needs bracing

ROOSHORS

make it easier



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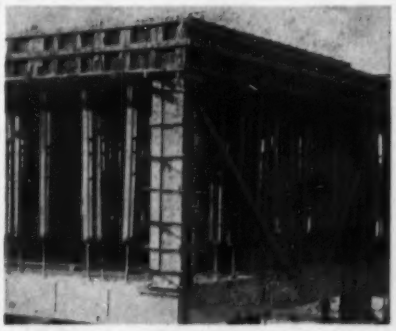
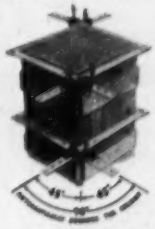
Ever try to drive a nail through bracing to hit a set hole in a metal pipe? Then you, too, would appreciate the ease in nailing bracing with ROOSHORS...their wooden upper members are the answer. The new ROOSHOR, extension type, actually gives you three shores in one . . . a *flat-head* shore, a *male-head* shore and an *extension* shore, by merely inserting any length 4 x 4 in the steel head. *More ROOSHORS have been used than any other adjustable shore!*



ROOS COLUMN CLAMPS

For speed and economy in column forming. Roos Column Clamps have six distinct advantages • two identical units • open either way • larger bars give greater strength • no loose parts • cannot be put on wrong • only hammer needed to tighten. ROOSHORS AND ROOS COLUMN CLAMPS are available for rental with purchase option from warehouse stocks in principal cities. Write for Bulletin 456.



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Gentlemen:
Please rush additional information, without obligation, on Rooshors and Roos Column Clamps.

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ELECTRIC VIBRATING GRIZZLY handles quarry-run sandstone, by-passing fines ahead of primary crusher so it can take full load of coarse material. (Jeffrey Mfg. Co. photo)

PRODUCING AGGREGATES . . . **continued from page 187**

Vibrating Feeders

Close control over the feeding of graded materials, particularly fines, often is accomplished with vibrating feeders. Such feeders employ either a high-speed mechanically imparted motion in a straight line at a fixed upward angle to the conveying surface or an electromagnetically induced motion generated by half-wave rectifier current.

Grizzlies

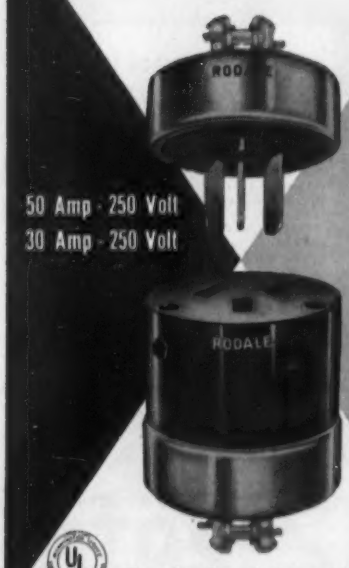
A grizzly often is installed between feeder and primary to by-pass relatively small size material around the crusher. Most popular is the bar grizzly, either stationary or vibrating. The vibrating bar grizzly has the advantage of greater freedom from clogging. Its bars are lined up in the direction of the material flow, with wider gaps at the discharge end to facilitate self-cleaning. Such grizzlies are, in effect, similar to scalping screens. The scalping screen assures greater protection against by-passing large slabs, however, and offers the opportunity of some sizing on a lower deck when desired.

Feeder Selection

In selecting an apron feeder for use with a primary crusher in a quarry operation, the question always arises, "How long and how wide should the feeder be?" Much depends on the maximum size of

NEW RODALE HEAVY DUTY CONNECTORS

GROUND CAP AND CONNECTOR FOR SAFE . . . TROUBLE-FREE OPERATION



EXCLUSIVE NEW PIN-TYPE GROUND

Armor grounding of the new Rodale 30 Amp and 50 Amp cord connectors is accomplished by means of a brass pin (1) attached to the grounding terminal (2) which slides into a tight fitting brass sleeve (3) that is riveted (4) to the metal armor.

In addition to assuring a positive ground, the pin and sleeve also provide a positioning index to guide the electrician when assembling the connector.

WITHSTANDS HEAT AND IMPACT

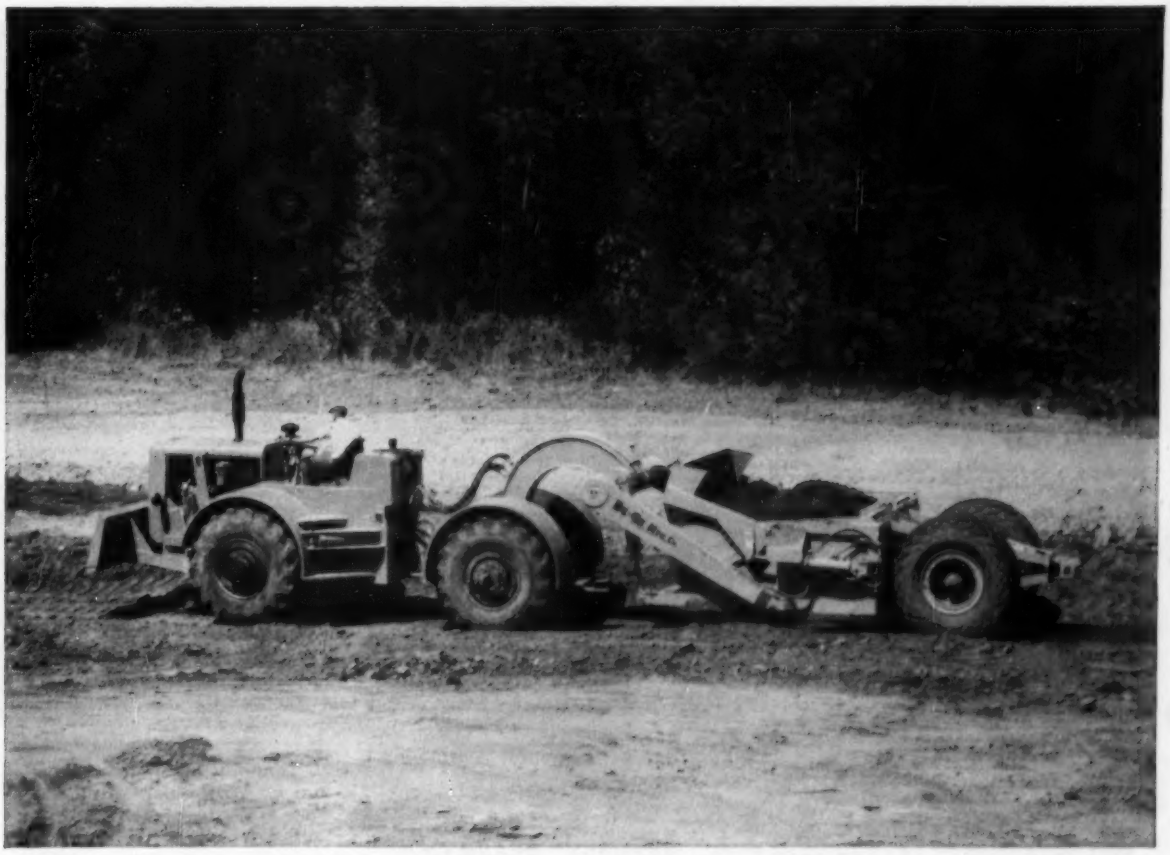
Rugged bodies are molded of a special asbestos-phenolic compound for high impact strength and heat resistance. Heavy steel armor has corrosion-resistant finish to take hard wear.

TERMINALS REQUIRE NO SOLDERING

"E-Z Loc" pressure plate terminals make possible permanent connections without bothersome and time-consuming soldering.

grounded for safety . . . manufactured for rugged, dependable service

For further information, write: **Rodale MANUFACTURING CO., INC. DEPT. C9 EMMAUS, PA.**



Wagner Model IND-14 Tractor equipped with Fuller R-96 ROADRANGER® Transmission.

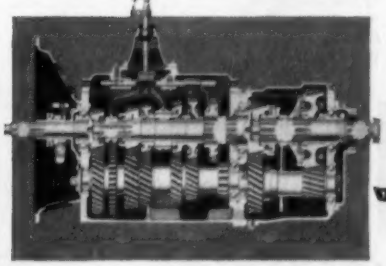
Wagner Earthmoving Tractors geared with FULLER semi-automatic TRANSMISSIONS

Sturdy Wagner IND-14 Tractors equipped with Fuller 10-speed R-96 Semi-Automatic ROADRANGER Transmissions handle tough construction jobs. Above, a Wagner Tractor is shown pulling a Be-Ge Scraper, moving heavy loads with ease.

Easier shifting and faster acceleration are features that make Wagner Tractors equipped with Fuller Transmissions real time savers. The R-96 ROADRANGER makes work easier for engines of the 960 cubic inch class in off-highway construction applications . . . the short, even steps between gear ratios keep the rpm in the maximum horsepower range.

There is no gear splitting . . . the 10 selective ratios are evenly and progressively spaced, averaging short 28% steps. One shift lever controls all 10 forward speeds. Range shifts are pre-selected . . . automatic and synchronized.

Fuller R-96 Semi-Automatic ROADRANGER Transmission



FULLER MANUFACTURING COMPANY
Transmission Division, Kalamazoo, Michigan

Unit Drop Forge Division, Milwaukee 1, Wisconsin • Shuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.

Now *from INTERNATIONAL...*

New "all-purpose" light-duty 4-wheel-drive truck!

Here's the four-wheel-drive truck you've been waiting for! Here's a full-size, all-purpose truck you can use to go anywhere.

On or off the road, this new INTERNATIONAL S-120 (4x4) will take the toughest grades in stride—fully loaded, it will move entire 7,000 lbs. of truck, body and cargo through soft sand, mud or snow. It's made to match all light-duty 4x4 jobs *exactly* with choice of 2 engines, 3 pickup, 2 stake and platform bodies, and the 8-passenger, triple-duty Travelall.® Exclusive INTERNATIONAL full-torque power take-off transfer case available, plus power take-off transmissions for auxiliary equipment operation. Available in 6 tire sizes, including 7.00 x 18 for extra clearance and 9.00 x 16 for extra flotation and traction.

This new INTERNATIONAL is all truck-built for rough, tough four-wheel-drive service . . . built to save you the BIG money, the operation and maintenance money. Before you buy any light-duty four-wheel-drive truck, see and drive this one at your INTERNATIONAL Dealer or Branch!

INTERNATIONAL HARVESTER COMPANY • CHICAGO

A Complete Line of All-Wheel-Drive Trucks for Every Tough Job Need

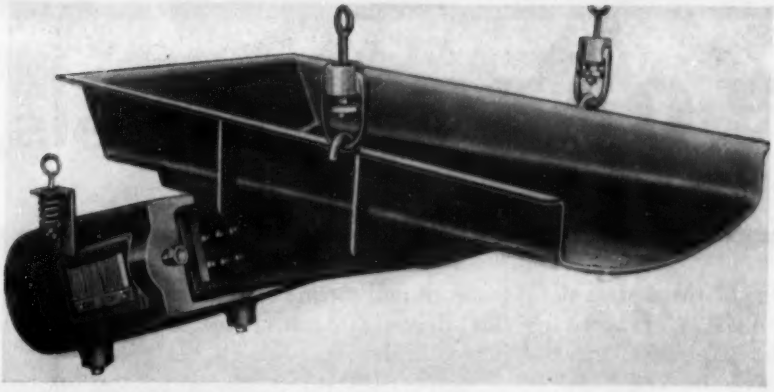
S-140 (4x4). 11,000 lbs. GVW. Has 4-speed transmission and 2-speed transfer case, for 8 forward and 2 reverse speeds.

Bigger models, too. S-160 (4x4) Series, 15,000-18,000 lbs. GVW. SF-170 (6x6) Series, to 26,000 lbs. GVW. All have exclusive INTERNATIONAL full-size Comfo-Vision cabs . . . feature easiest steering and handling.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors



ELECTROMAGNETIC VIBRATORY FEEDER with 30x66-in. trough will handle as much as 20 tph. This style of unit is generally used for feeding graded materials. (Syntron Co. photo.)

PRODUCING AGGREGATES . . .

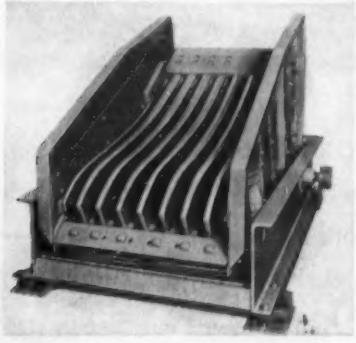
continued from page 188

stone and the size of the units hauling to the plant. But selection can be guided by the size of crusher to be fed, as follows:

Size of Jaw Crusher	Size of Apron Feeder
20"x36"	36"x10'
24"x36"	36"x12'
30"x42"	42"x14'
42"x48"	48"x16' to 18'

With reciprocating plate feeders, it is good practice to use a 24-in. wide feeder with an 18 to 24-in. conveyor; a 30-in. feeder with a 30 or 36-in. conveyor; and a 36-in. feeder with a 36 or 42-in. conveyor. For conveyor widths exceeding 42 in., it is preferable to use either an apron or vibrating feeder.

Obviously, a feeder taking heavy dump loads must have an adequate foundation and supporting structure. And sufficient support and bracing must be provided for the hopper over the feeder.



CURVED BARS of vibrating grizzly for wet or sticky material tend to tumble it as it passes. (Nordberg Mfg. Co. photo.)

Feeder Capacities

Table I (p.195) gives capacity normally expected ,from apron feeders operated under the conditions indicated. But bear in mind that considerable variance will be encountered when calculating the capacities of feeders as generally used with primary crushers. Experience usually is the best guide to what a feeder will handle under given conditions of material, rate of pan travel, and depth of loading.

The capacities indicated in the

Continued on page 195

Here's the business end of a heater

When you buy a heater, don't stand in front of it; stand behind it. All heaters are hot in front, but their value to you depends on the rear end.

If you want *circulated warm air* indoors, *powerful spot heating* outside, if you want to *dry plaster*, pour and *cure concrete* and *keep the job rolling* in any weather, you need a Master heater.

It's a compact furnace-on-wheels, with starter, fan, thermostat, filter, pressure atomizing burner, insulated fire chamber and all. It rolls into place, starts at the flip of a switch, needs no vent and burns low cost kerosene or fuel oil.

We think it gives you more good heating for your money than any other type heater. Write for the free folder "Summer Warmth in Winter" or call your Master Distributor and see if you don't agree.

MASTER VIBRATOR COMPANY
356 Stanley Ave., Dayton 1, Ohio

MASTER

3 PAYLOADER® models

Now you have a choice of three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, each with *all* the more-productive features pioneered and proven by The Frank G. Hough Co.

They have power-transfer differentials—an exclusive "PAYLOADER" tractor-shovel feature that maintains effective traction on mud, gravel, ice and snow.

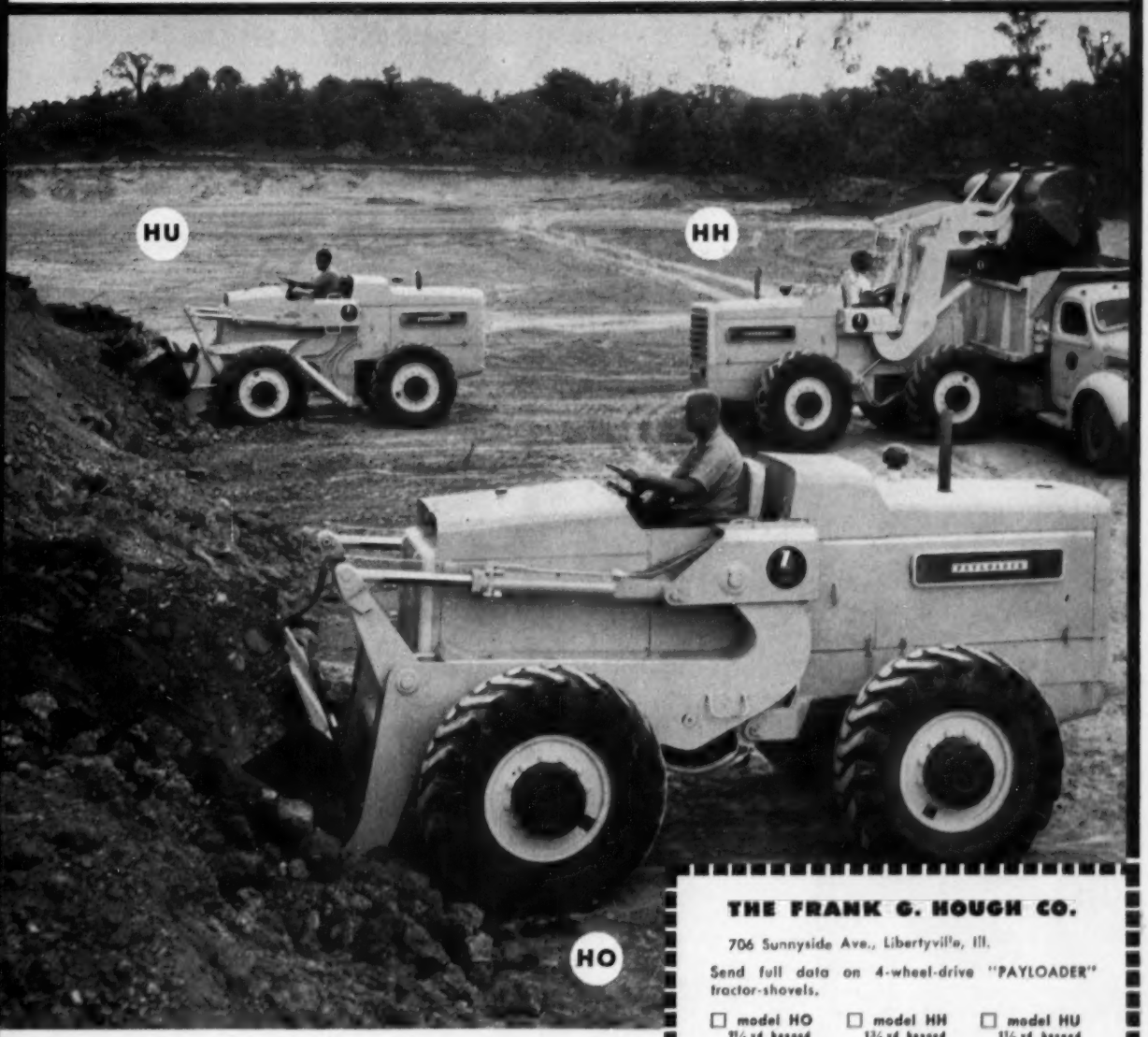
They have "no-stop" power-shift transmissions and torque converters . . . planetary final drives . . . power-steering and 4-wheel power brakes.

They have the exclusive bucket motion with 40° bucket tip-back at ground level and powerful pry-out action.

For proof of their superior performance and greater productive capacity, ask your "PAYLOADER" distributor for a demonstration.

1	**Dig More**	Powerful pry-out action and 40° bucket tip-back at ground level get full bucket loads with less spillage loss. Power-transfer differentials provide sure-footed traction for digging power.
2	**Carry More**	Bucket carry position is close and low for maximum stability. Hydraulic system shock absorber cushions loaded bucket — smooths the ride — permits higher carrying speeds with less spillage.
3	**Deliver More**	Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result — you deliver more yards per load and more loads per hour.

.. 3 WAYS BETTER!



The "PAYLOADER" line is the most complete, most proven tractor-shovel line — sizes from 1¼ cu. ft. to 2¼ cu. yd. . . . choices of front-wheel-, rear-wheel- and all-wheel-drive.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.

706 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" tractor-shovels.

☐ model HO	☐ model HH	☐ model HU
2¼ yd. heaped	1⅝ yd. heaped	1⅛ yd. heaped
1¾ yd. struck	1⅓ yd. struck	1 yd. struck

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____

STATE _____

"I built my business on Gar Wood dependability!"

—says William J. Booth, Pinellas Park, Florida

Here, one of Bill Booth's "75's" works with a Vibra-Flotation attachment packing sand for a school foundation. Another "75" is currently being used to dig drainage ditch for the development of river front property. His third Gar Wood machine works in a pit, loads out 1200 yards of fill per day.

Bill Booth knows from experience that good equipment is essential to success as a contractor. He reports: "I started in the excavating business with a Gar Wood '75B' dragline five years ago. Today my equipment spread includes three Gar Wood machines. They've been good, dependable machines... delivering the production I need *when* I need it!"

This kind of low-cost, dependable production is the result of many Gar Wood "75" design advantages. Independent travel while swinging gives you mobility to speed loading . . . you can hoist or swing while moving. Power actuated drum clutches increase production by reducing operator fatigue. Direct manual controls retain true operator "feel".

Maintenance is easier, too. Gar Wood's massive crawler base takes extreme shock and strain. Heavy-duty conical hook double rollers eliminate pin strain and rocking under load. Compact machinery deck is easily accessible for adjustments or servicing.

Gar Wood excavators are built by specialists in ¾ yard machines. Call your Gar Wood dealer and find out how this specialization can pay off on your jobs. Or, write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan • Findlay, Ohio

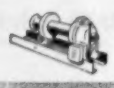
Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood-Buckeye Hi-Way Wideners

Gar Wood Tractor Equipment

Gar Wood-Buckeye Ditchers

Gar Wood-Buckeye Finegraders


Gar Wood Winches

Gar Wood-St. Paul Hoists & Bodies

TABLE 1.
Per Hour Capacities of Apron Feeders According to Width

Pan Travel (Ft. per Min.)	30" Wide		36" Wide		42" Wide		48" Wide		60" Wide		72" Wide	
	Cu. Yds.	Tons	Cu. Yds.	Tons	Cu. Yds.	Tons	Cu. Yds.	Tons	Cu. Yds.	Tons	Cu. Yds.	Tons
10	55	74	80	108	109	147	143	192	222	300	320	432
15	83	112	120	162	164	222	214	289	333	450	480	648
20	110	148	160	216	218	294	284	384	444	600	640	864
25	138	186	200	270	273	369	357	482	555	750	800	1080
30	165	223	240	324	327	442	427	577	667	900	960	1296

Based on loading to a depth equal to one-half the feeder width.

TABLE 2.
Capacities and Horsepowers of Reciprocating Plate Feeders

Feeder Width	16"	20"	24"	30"	36"	48"	60"
Capacity, Cu. Yd./Hr.	15–50	20–80	30–125	50–200	70–275	125–500	175–750
Horsepower	1½	1½	3	5	7½	10	20

TABLE 3.
Minimum Horsepower Required for Lengths and Widths of Apron Feeders

Length (Feet)	30" Wide	36" Wide	42" Wide	48" Wide	60" Wide	72" Wide
6-8	5	5	5	7½	10	10
10-12	5	7½	7½	7½	10	10
14-16	7½	10	10	10	10	15
18-20	7½	10	10	15	15	15
22-24	10	10	15	15	15	20
26-28	10	15	15	15	20	20

Horsepowers given are minimums recommended and should be applied to feeder on horizontal, handling load of depth equal to one-half width of feeder at pan travel of 15' per minute. If variable speed motors are to be used, horsepower should be double that shown.

PRODUCING AGGREGATES . . .

continued from page 191

table are based on a depth of material equal to one-half the feeder width. A feeding factor of 0.8 has been introduced to compensate for such things as voids and resistance to flow.

As the feeding factor varies with the type of material and its condition when fed, some judgment will have to be used in determining its magnitude. If the material is well graded and compacted, the feeding factor may approach 1.0. Chunky material with many large voids between lumps might have a feeding factor as low as 0.5. Where it is felt that the feeding factor will be other than 0.8, the following formula for calculating the feeder capacity is helpful:

Cu yd per hr = 2.22 (D W S F):

D=Depth of load on feeder (ft).

W=Width of feeder (ft).

S=Speed of pan travel (fpm).

F=Feeding factor.

(To convert cu yd per hr to tons per hr, multiply by weight of material in lb per cu yd divided by 2,000.)

With reciprocating plate feeders

3 Simple Reasons Why MC TRANSCRETES Put Bigger Profits in Your Pocket!

❶ FASTER CHARGING

❷ MORE THORO MIXING

Take features like TRANSCRETE'S time-tested outswinging hopper and floating drive — add to them NEW SHORTER OVERALL LENGTH — and it's no wonder TRANSCRETE beats 'em all a country mile for pouring more and better concrete — easier, faster — and at less cost!

There's a size TRANSCRETE (4 models, from 3½ to 7 yard mixing capacities) to do any job in the books.

New Model 700 hauls up to 8 plus yard loads — mixes any 7-yard batch. Write CONSTRUCTION MACHINERY CO., Waterloo, Iowa.

❸ QUICKER DISCHARGE

ALSO MANUFACTURER OF A COMPLETE LINE OF
BUILDING MIXERS • CENTRAL PLANT MIXERS • PLASTER & MORTAR MIXERS
PUMPS • HOISTS

To Help Your Pumps Give Top Performance Every Working Hour!

"NEWTYPE"

SUCTION AND DISCHARGE HOSE

A GOODALL "Standard of Quality" PRODUCT

Put "NEWTYPE" on your pumps and watch them keep on giving their *best* . . . day-after-day. Why? Because this *quality* hose will not kink, buckle or collapse, and has the great strength and durability to stand up *longer* under severest wear and abuse. Made in sizes 1¼" to 4", inclusive, in maximum lengths of 50 feet. Readily identified by a green spiral stripe on the black cover, plus the familiar "Cloverleaf" label.

"If it's GOODALL . . it MUST be Good!"

Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870

HOSE · BELTING · FOOTWEAR · CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

PRODUCING AGGREGATES . . .
continued from page 195

OPERATOR must watch crusher and control apron feeder so no large rocks are dumped in until the jaws are almost empty.

there are so many variables that it is best to give only a wide range of capacities for each width of feeder, as indicated in Table II. This table also shows average operating hp required. Table III gives required hp for efficient operation of apron feeders, taking into account heavy loads of blocky material offering considerable resistance to flow.

There is much similarity in the basic design of specific types of feeders by different manufacturers; variances are largely those of structural details and mechanical features. But performance does differ, and the contractor should ascertain that the feeder of his choice is fully adequate to stand up and give lasting service on the job for which it is intended. A feeder, particularly one feeding a primary breaker, is subject to terrific impact and heavy loads of tough, abrasive materials. Therefore, the matter of price alone, while important of course, should not be the governing factor in selection. When a feeder is down for repairs, the whole plant operation usually is at a standstill.

The third article on Producing Aggregates will appear in our October issue and will discuss crushing.

Stockpiling, ditching, grading, <u>any</u> wheel tractor job...

NEW INTERNATIONAL® 300 UTILITY TRACTOR OUTWORKS THEM ALL!

Here's the Score!

Tops the field in pull and push-power! Delivers 4,379 pounds maximum pull at typical operating weight. 39.5 maximum drawbar hp.

10 speeds forward, 2 reverse with optional IH Torque Amplifier drive. Operator can change speed in any gear to boost pull-power up to 45% *On The Go!*

UNLIMITED hydraulic equipment control. Front and rear-mounted equipment controlled individually or *both at the same time*, using either single or double-acting cylinders—*or both*. Front and rear power drives available for equipment with built-in pumps.

Fast-Hitch. Just back the tractor—equipment coupling beams engage *automatically* on rear-mounted blades, scoops, and other Fast-Hitch equipment. Low-cost adapter available for 3-point equipment.

Power Steer. Optional. Takes work out of maneuvering in soft, rutted ground; reduces operator fatigue particularly on loader jobs.

Here's a new utility tractor that outperforms and outlasts anything you've seen up to now! It has up to 1,000 pounds more built-in weight to deliver traction where lighter weight utility tractors slip or stall. Big pneumatic tires turn this power and weight into effective traction equally well on paved factory aisles and yards, and on the soft footing of construction and other off-pavement work. *Ten forward speeds to 16.8 mph*, with exclusive Torque Amplifier drive, lets the operator select the best working speed for each specific job.

UTILITY IS THE NAME FOR IT!

For construction, industry, business, and endless county and municipal applications, the International 300 Utility is easily equipped with fork lift, materials loader, backfill and 'dozer blades, backhoe, grounds maintenance equipment, compressor, crane, hole digger, snow plow, street sweeper, dirt scoop, or any of many others. Prove the 300 Utility's advantages to yourself. Ask for a demonstration on your job.

See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

INTERNATIONAL HARVESTER

International® Construction Equipment

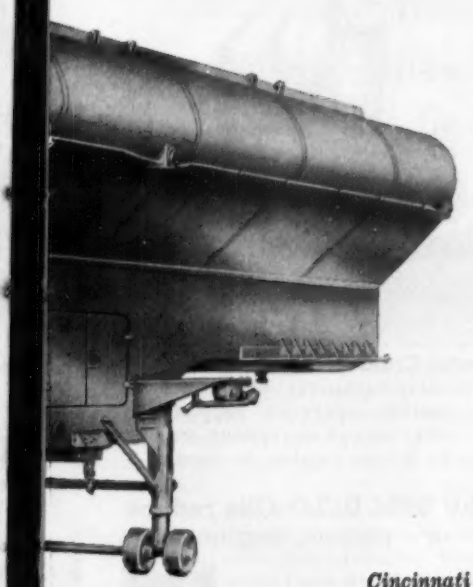
International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks.

Here is the TRAILMOBILE
TRAILMOBILE

ALUMINUM cement bulker

a strong, streamlined, service-proved design



The newest thing about the Trailmobile aluminum cement bulker is the aluminum itself—for we have constructed in aluminum the same strength and ruggedness, the same safety and ease of operation that have made Trailmobile's steel bulkers high-profit performers for years.

In the aluminum bulker a weight saving of approximately 3,000 lbs.* gives you as much as 7% more payload capacity—enough added revenue in many operations to repay the cost of the trailer itself in a matter of months. We've also streamlined the unit by providing a smooth skin side without ribbing of any kind. And we've proved the over-all design under actual operating conditions during the past two years.

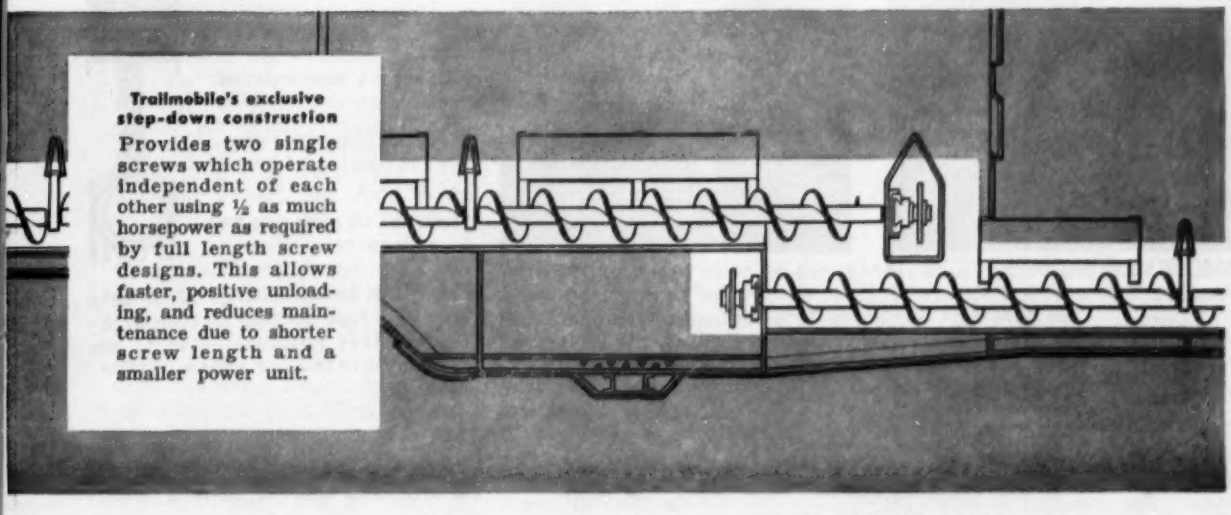
The Trailmobile aluminum bulker is a part of a complete line of bulk commodity trailers that meet every need. Call or write your nearest Trailmobile branch office for complete information.

**on 130-barrel unit*

TR-476

TRAILMOBILE INC.

Cincinnati 9, Ohio • Springfield, Missouri • Longview, Texas • Berkeley 10, California



Trailmobile's exclusive step-down construction

Provides two single screws which operate independent of each other using ½ as much horsepower as required by full length screw designs. This allows faster, positive unloading, and reduces maintenance due to shorter screw length and a smaller power unit.

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

EDWARD KEEBLE CONSTRUCTION CO.
FIRM San Jose, California

RPM DELO Oil keeps tractor on the job 15 years

Still Working after 15 years using RPM DELO Oil in this D-8 Caterpillar operated by Edward Keeble Construction Co. Block, crankshaft, and most other parts of original engine are still in use. Another of firm's D-8's using RPM DELO Oil ran 12,000 hours without engine repairs. When torn down, maximum crankshaft wear was .004".

Crawler Crane, like firm's other heavy-duty equipment, uses RPM DELO Oil. Keeble operates 120 pieces of construction equipment—has as many as 30 jobs going at once.

GMC V-8 10-Yard Dump Truck (left), one of a new fleet of 12, also uses RPM DELO Oil. Mr. Keeble (right), says, "For the past 15 years we have kept our heavy-duty engines in top operating condition with RPM DELO Oil. In several instances engines have actually outlasted equipment."

Why RPM DELO Oils reduce wear—prolong engine life

- *Oil stays on engine parts - hot or cold, running or idle
- *Anti-oxidant resists lacquer formation
- *Detergent keeps parts clean
- *Special compounds prevent corrosion of bearing metals
- *Inhibitor resists crankcase foaming

For More Information or field help with any fuel or lubrication problem, contact representative of any company listed, or write direct.

LUBRICATING OILS RPM DELO

TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Construction Men in the News . . .

Corps of Engineers Gets New Chief

MAJ. GEN. EMERSON C. ITSCHNER (left) will be the new Chief of Army Engineers succeeding LT. **GEN. SAMUEL D. STURGIS** (right) who is retiring. Gen. Itschner was named to the post this month by President Eisenhower. His appointment—subject to Senate confirmation—becomes effective Oct 1.

Gen. Itschner, at 53, is one of the youngest officers ever to be appointed to the top post in the Corps of Engineers. Not since 1838 has a younger man been selected for the job.

As Chief of the 181-yr-old Corps, Itschner will head both a combatant army and a technical branch with a present peacetime strength of 10,000 officers, 100,000 enlisted men, and 50,000 civilians. Apart from military construction and civil works programs, he will direct the training and schooling of engineer military personnel; The largest map-making enterprise in the world; An engineer procurement and maintenance program spending $175 million a year; The management of military real estate valued at more than $25 billion; The repair and maintenance of completed Army facilities around the world; And an extensive research and development program.

Gen. Itschner was born in Chicago in 1903 and began his career with the Army Engineers in 1924 on graduation from West Point. In succeeding years he was given various military, civil works, and educational assignments.

During early World War II, while the Air Force construction program was at its height, he was in charge of Air Force construction for the Chief of Engineers. Later, as engineer of the Advance Section, Communications Zone in Europe, he was responsible for heavy construction within the areas of the armies which entered through northern France. At the end of the war he was assigned as Base Commander in the Philippines.

He next served three years in Washington, D. C., as Chief of the Military Construction Operations Division in the office of the Chief of Engineers. He was District Engineer at Seattle, Wash., from 1949 to 1950.

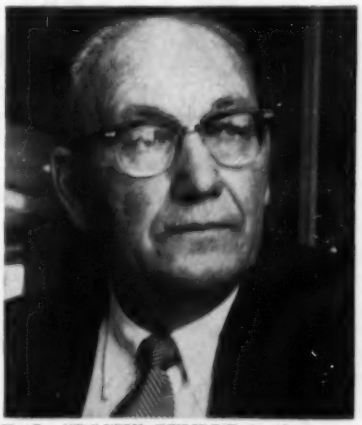
In 1950 he became Engineer of the First Corps and served 14 months in Korea. 1952 saw him assigned as North Pacific Division Engineer for a period of two years. Then he returned to Washington to serve as Assistant Chief of Engineers for Civil Works. He has, since March 1954, been responsible for supervising the investigation, planning, construction, and maintenance of federal river and harbor, flood control, and multi-purpose projects. Gen. Sturgis' retirement concludes a rich and colorful Army career. In early 1940 he was assigned as District Engineer at Vicksburg, Miss., where he worked for 2½ yr on Mississippi River navigation and flood control and some $200 million in construction of cantonments, airbases, and ordnance plants.

He became Chief Engineer, Sixth Army, in 1943 and for three years he was in charge of all airbase, port, and army construction in 22 amphibious operations from Australia to Japan. He returned to the U.S. in 1946 to become Air Engineer of the U.S. Air Force in Washington, D. C. The following May he became Division Engineer, Missouri River Division, taking over from Maj. Gen. Lewis A. Pick the big Missouri Valley development program.

In 1951 Sturgis was assigned as Commanding General, Sixth Armored Division. In 1952 he became Commanding General of the Communications Zone supporting the U.S. Army in Europe with headquarters in Orleans, France. He was appointed Chief of Engineers to suceeed Gen. Pick in November 1952.

His father, Major General Samuel D. Sturgis commanded the 87th Division in World War I. His grandfather, Brevet Major General Samuel D. Sturgis fought in the Civil War while an uncle, Lt. J. G. Sturgis, an officer with the 7th Cavalry, was killed with Custer in the Battle of the Little Big Horn in 1876.

Among Sturgis' decorations are the Silver Star, the Legion of Merit, the Bronze Star Medal and the Distinguished Service Medal.



R. L. "DICK" SENIOR is the new construction manager for F. H. McGraw & Co., engineers and constructors. His appointment is the newest phase of a 44-yr career that includes supervision of nearly $2 billion in construction.

A construction manager who rose through the design ranks, Senior spent most of his career in the field. It began in 1912 when

he worked days as a draftsman and studied engineering nights at Brooklyn Polytechnical Institute. He served in France as a Lieutenant in the Corps of Engineers, during World War I. After the war, Senior was an estimator and superintendent on all types of construction in New York and New England. In 1929 he formed his own engineering and construction firm, R. L. Senior, Inc.

Early during World War II, he served as general superintendent on construction of naval facilities near Londonderry, Ireland, for an American combine. On his return to the U.S. he was a superintendent at the Davisville Naval Base in Rhode Island.

Since then his jobs have included additions to the Doubleday printing plant in Garden City, Long Island; the $30 million American Community Building in Chicago; a shopping center and 3,000 homes in Park Forest, Ill.; 1,000-bed veterans hospital in Pittsburgh, Pa.; and a $1 billion atomic plant at Portsmouth, Ohio.

Senior is a 31-yr-member (associate) of the American Society of Civil Engineers.

L. F. WYLIE is the new construction engineer for Glen Canyon Dam on the Colorado River. He was appointed to the post by Secretary of the Interior Fred A. Seaton.

Wylie began his Bureau of Reclamation career in 1932 as an assistant engineer on Hoover Dam. As construction engineer he will have primary on-the-job responsibility for the building of Glen Canyon, a principal structure of the Colorado River Storage project.

COL. ALDO H. BAGNULO is the new District Engineer for the Eastern Coast District, Army Corps of Engineers. Bagnulo succeeds Col. Morton Solomon who is being assigned to the Office of the Chief of Engineers, Washington, D. C., as deputy assistant for engineering and contracts. Both assignments become effective August 22.

Bagnulo has been Air Installations Officer at Langley Field, Va., served four years in the Office of the Chief of Engineers, and, in June, 1952, became District Engineer of the St. Paul, Minn., District. In October, 1954, he was appointed area engineer at Keflavik, Iceland. He recently was Assistant District Engineer for the Eastern Ocean District which handles Greenland, Labardor, Iceland, and Bermuda.

With the Corps of Engineers . . .

BRIG. GEN. WALTER K. WILSON, JR., and COL. GUNNARD W. CARLSON, both Corps of Engineers officers, have been awarded the Legion of Honor by the Republic of France.

Brig. Gen. Marcel Penette, French military attache, made the presentations at the French Embassy in Washington, D. C. The awards were for the services and cooperation given the French authorities by Gen. Wilson and Col. Carlson while they were respectively division engineer and assistant division engineer, Mediterranean Division. Their responsibilities then included the construction of military bases in French Morocco. Both officers are now on duty in Washington. Gen. Wilson is assistant chief of engineers for military construction; Col. Carlson is resident member of the Board of Engineers for Rivers and Harbors.

CHUNKY DIAMOND PARTICLES

Important to Diamond Blade Life

Here's what a good, hard-working diamond particle looks like . . . the kind you consistently find in every Felker Segmented Wheel.

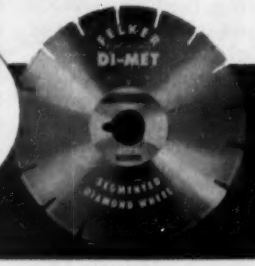
Long, skinny splinters can't withstand heavy impact loads. Loss of cutting speed and blade efficiency are the natural outcome.

Another reason for Felker Segmented Blade leadership in concrete cutting

At Felker Manufacturing Company we go to a lot of effort to make the best diamond wheels you can buy. A most important step in blade manufacture is reduction of the diamonds to correct particle size. Simply shattering the diamonds isn't enough . . . this produces a variety of particle shapes which is disadvantageous. *Longest life and most work result when the tiny diamonds are compact in shape, of nearly uniform length, breadth and thickness.* This structure increases strength, resists fracturing and minimizes loss of diamonds when wheel is in use. These particular diamond shapes also possess a myriad of sharp cutting edges which increase cutting speed of the blade:

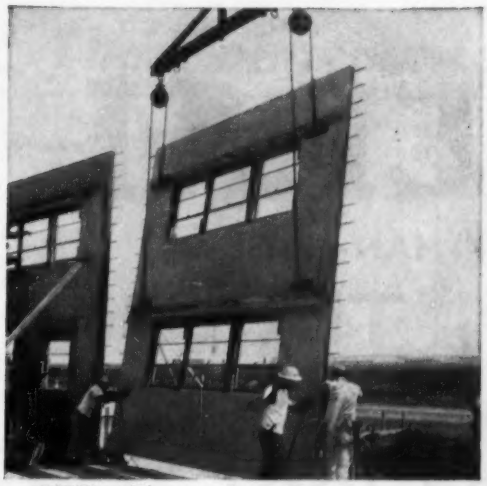
By developing special crushing and separating techniques at Felker Manufacturing Company, the weaker diamond splinters, flakes and useless "fines" are eliminated. Only carefully graded, properly shaped diamond particles ever go into Felker Segmented Blades—*another insurance of top quality performance on every concrete cutting job!*

FELKER DI-MET SINCE 1924

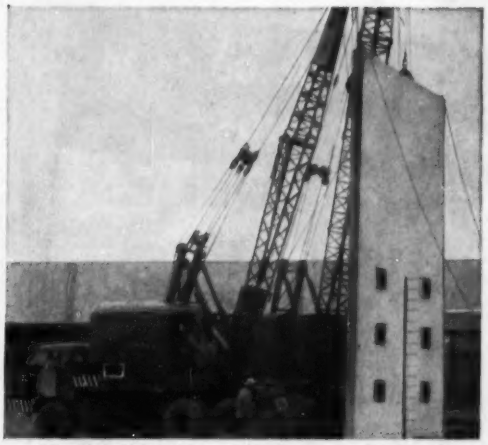


FELKER MANUFACTURING CO.
TORRANCE, CALIFORNIA

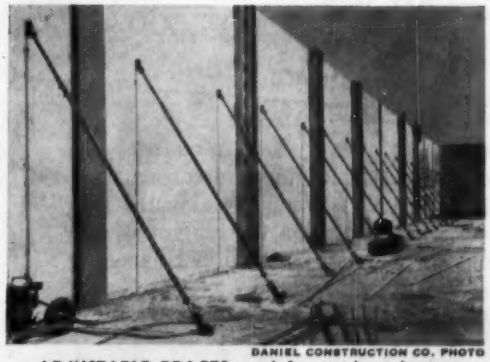
World's largest and oldest manufacturer of diamond abrasive cut-off wheels and machines.



PANEL with large window areas



57 TON SLAB being positioned



DANIEL CONSTRUCTION CO. PHOTO

ADJUSTABLE BRACES used for quick and easy alignment of panels

WAREHOUSE

DANIEL CONSTRUCTION CO. PHOTO

Tilt-Up Costs Go Down

...with SUPERIOR "Pick-Up" Inserts, Brace Anchors, and Braces

When an outstanding Tilt-Up job rates an article in a construction publication you can be almost certain that SUPERIOR products were used. The reason is simple. SUPERIOR, as the pioneer in this field, developed designs that were thoroughly tested both in the laboratory and the field to assure safety with economical prices and low application costs.

These "Pick-Up" Inserts, Brace Anchors, and Adjustable Braces have been used and proven on literally thousands of projects, not a few of which were unique in design. With a background of such experience, the recommendation of our engineers as to location and types of Inserts and Anchors is reliable and valuable.

Avoid expensive crane delays, be assured of safety, and reduce your overall costs with these SUPERIOR products.

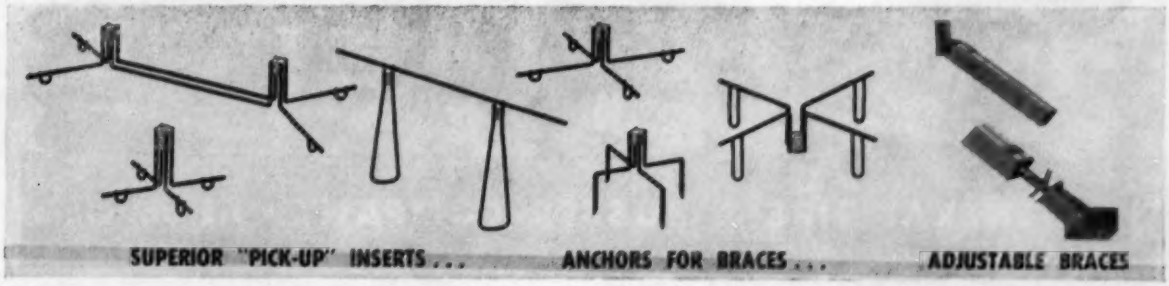
For further details request a copy of Bulletin TU-3

SUPERIOR
CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway
New York 19, N. Y.

Pacific Coast Plant
2100 Williams St.
San Leandro, Calif.



SUPERIOR "PICK-UP" INSERTS . . . ANCHORS FOR BRACES . . . ADJUSTABLE BRACES

HERE'S PROOF!

GENERAL

STRONGER-THAN-STEEL

NYGEN® TIRES

save more money per hour on any job!

GENERAL L. C. M. 24 PLY 16.00-24/25 vs COMPETITIVE BRANDS*

COST PER TIRE HOUR OF SERVICE

AVERAGE COMPETITIVE	.259
GENERAL LCM NYGEN	.224

SAVINGS

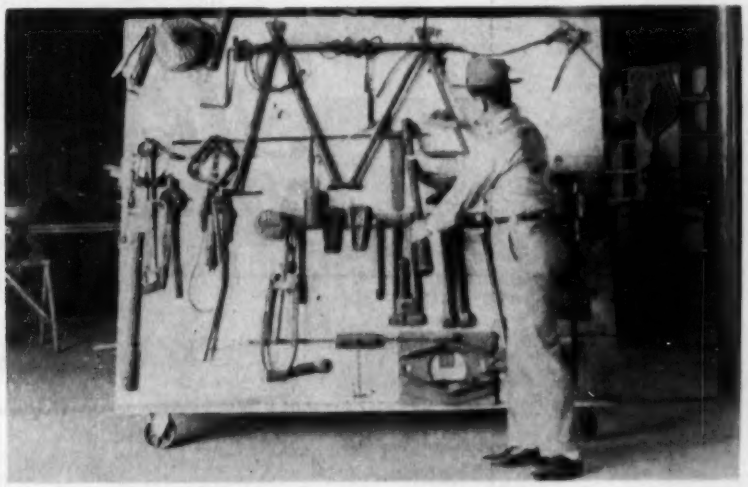
PER TIRE PER HOUR	$... .03½
PER HOUR 10-TIRE TRUCK	$... 0.35
ONE TRUCK 10-HOUR DAY	$... 3.50
ONE TRUCK 200 DAY YEAR	$... 700.00
50 TRUCKS-200 DAY YEAR	$35,000.00

*FROM ACTUAL SERVICE RECORDS

THE GENERAL TRUCK TIRE

Every hour of every day, in quarries and strip mines, on logging and construction jobs the nation over, The General Tire proves its reputation for toughness, dependability and low-cost performance!

THE GENERAL TIRE & RUBBER COMPANY • Akron, Ohio



CUSTOM-MADE TOOLS on portable rack include ring compressors, water pump pulley puller, shaft puller, thread chaser for track spring, winch, and clamp for compressing seal springs on bottom rollers so that one man can install rollers on track frame.

Special Tools Built From Scrap

STAN MYSZKOWSKI, who calls himself a glorified junkman, is a valuable guy to have around, according to L. C. Fuller, vice president of Browning-Ferris Machinery Co., Dallas, Tex., distributor for International-Harvester.

Stan heads up a thriving salvage department, which was started to improve Browning-Ferris' bargaining position on trade-ins. His job is to salvage parts from old equipment that ordinarily would be scrapped completely.

It is an extensive operation. Last year, as an example, Myszkowski and his men disassembled more than 40 TD-18s, as well as a lot of other equipment.

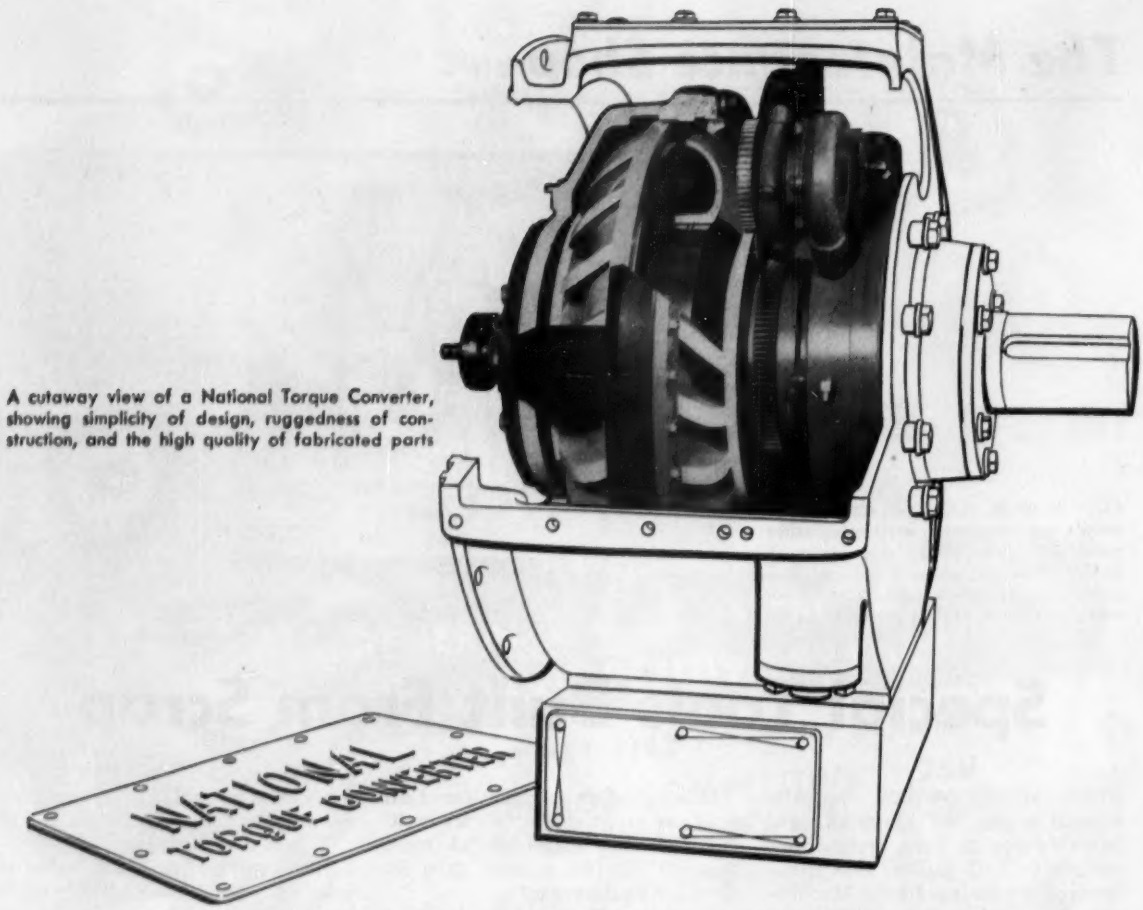
Browning-Ferris has built a $30,000 structure to house the salvage department and equipped it with the latest in shop tools. Myszkowski, however, is a hard man to satisfy. Many times while disassembling a rig he finds himself wishing that he had the tool to do a special job faster and easier. Such tools are not always available on the market.

This is where Myszkowski's particular genius comes in. From scrap left over after all salvageable parts have been turned over to the repair shop, he has fabricated a set of tools tailor-made to speed up the disassembly and repair of tractor parts.

Among these tools are a winch and frame assembly that allows one man to remove or install steering clutches in the field, a jig that ro-

ONE MAN can install or remove steering clutches in the field with this custom-built winch and frame assembly. It consists of a TD-14 crank, a discarded TD-9 transgear, and scrap pipe.

HANDY JIG for rebuilding or grinding sprockets, idlers, and other salvageable parts rotates on old Adams clutch throwout bearing. The shaft is pinion shaft from a junked TD-18.



A cutaway view of a National Torque Converter, showing simplicity of design, ruggedness of construction, and the high quality of fabricated parts

It's rugged...it's durable...it's dependable...

it's a NATIONAL Torque Converter

The simple, rugged design of National Torque Converters offers many unique features.

Converter is easy to install.

Equipment service life is prolonged.

Maintenance of equipment and torque converter is at a minimum, even in the roughest, toughest industrial service.

Meets the most rugged demands of practically every heavy-duty application—oil drilling rigs, excavating, earth-handling, mining, logging and similar equipment.

In addition, precision fabrication provides uniform high efficiency permitting standardization of National Torque Converter on your equipment with assurance of uniform top performance.

And you have a choice of 6 basic hydraulic circuit sizes, each with a range of input ratings, to permit *exact matching* of torque converter to engines of 100 to 1000 horsepower.

National engineers will gladly work with your designers to arrive at the correct size and capacity of National Torque Converter for the specific power-speed characteristics of your equipment. Why not call on us today?

A copy of Bulletin No. 468, descriptive of National Torque Converters, is available on request.

THE NATIONAL SUPPLY COMPANY

INDUSTRIAL PRODUCTS DIVISION

Two Gateway Center, Pittsburgh 22, Pa.

Pace-setters in the progress of industrial power transmission

"We're Hauling 20-Ton Loads in New Jersey's Heavy Traffic— and Getting 7 MPG!"

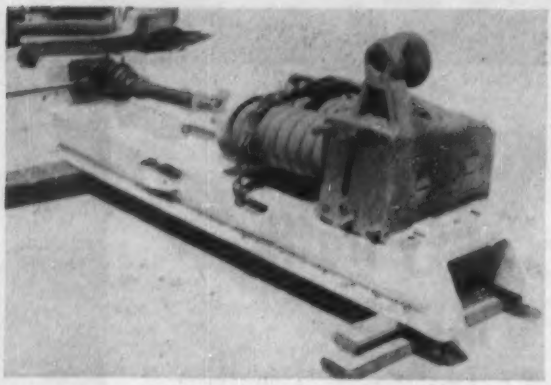
— says Anthony Ferrante of Somerset Crushed Stone, Bernardsville, N. J., in reporting on his 25 GMC trucks

WHILE CLOCKING 50,000 TOUGH MILES A YEAR—in a punishing combination of on-and-off-the-road work—Somerset's GMC W635's turn in amazingly low operating figures. Down-time has been considerably less than the other-make trucks in the fleet, Truck Manager George West reports. And the new GMC rear ends have given them *exceptionally satisfactory service*. Yet these GMC's aren't pampered. In fact, each rig puts in *two years* of hard work before it gets even a carbon and valve job.

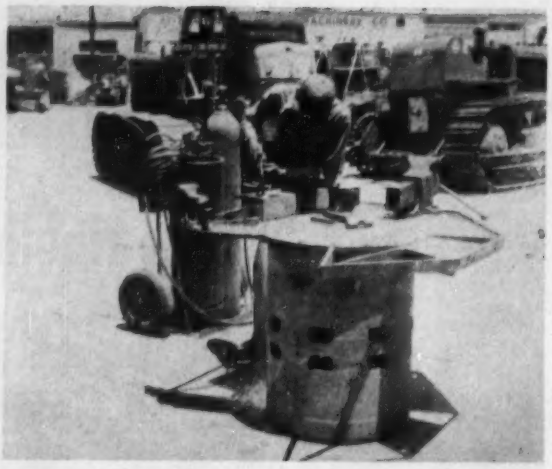
POWER TO ZOOM 14-YARD LOADS UP OUT OF THE PIT FAST comes from GMC's big 225-hp "503" engine. And once on the highway, that quick-stepping power helps cut trip-time—make more trips during normal working hours. What's more, Somerset is getting this standout GMC performance on an amazing 7 mpg — even though they travel some of the busiest New Jersey highways. That's a full mpg better than comparable trucks doing the same job.

"THOSE GMC's ARE NO. 1 IN OUR FLEET," says Somerset owner, Anthony Ferrante. His reason: Simply that the GMC's cost less to operate—so they make more money. Result: They have 6 more new GMC W635 tandems on order as this is written!

GMC TRUCK & COACH
A General Motors Division



TRACK SPRING COMPRESSOR, made from the unserviceable track frame of a TD-18, makes it easier to replace retainers, broken bolts, or springs on most International tractor models.



WELDING TABLE consists of dual-wheel casters from a motor grader, wheel tractor drawbar parts, and bulkhead plate. Vise is only part of table not made from scrapped materials.

tates on bearings for welding or grinding sprockets or idlers, ring compressors made from engine sleeves, and various attachments for pullers and wrenches so that they can be used in hard-to-get-at places. Even tool racks are fabricated from scrap material.

With his tailor-made tools, Myszkowski and two of his men can disassemble an average size tractor from tracks to exhaust in less than two days. According to Fuller, this is one of the factors that makes the salvage operation worthwhile. Obviously, for such an operation to be successful, the recovery costs, represented by labor, must be kept to a minimum.

When these costs are controlled, a good profit can be made from items that are salvaged, reconditioned, and sold at about 50% of the list price for a new part.

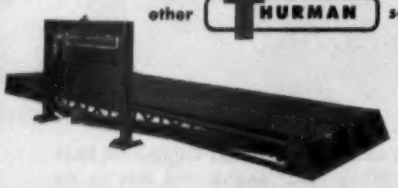
ACCURATE PORTABLE WEIGHING

THURMAN PROVED EASIEST Truck Scale to move!

NO CONCRETE PITS NEEDED! Thurman Portable Truck Scales maintain their accuracy under the most rugged conditions. These scales move from job to job easily . . . set-up in minutes. Ramp earth at each end, lets truck move into position. Proven by on-the-job performance and accuracy with hundreds of contracting firms. Write today for bulletin 601. *Capacities: 20 to 50 ton. Deck Lengths: 18 to 43 ft.*

can also be installed as a PITLESS SCALE—saves on expensive pit costs

other THURMAN scales



Batching Scales
Liquid Weighing Scales
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Industrial Scales
Pit Scales
Warehouse Scales
Wheelbarrow Scales
Electronic Scales

THURMAN

Precision Products since 1918

THURMAN MACHINE COMPANY, DEPT. N, 156 N. 5th STREET, COLUMBUS, OHIO

Westinghouse Electric Corporation

Hydraulic torque converters and power shift transmissions meet specialized equipment needs

Harmonizing engine characteristics with your drive problems is a specialty of Westinghouse hydraulic drives engineering. The result is a hydraulic drive that assures maximum *work output* of your equipment, simplifies operator training, and reduces maintenance.

Westinghouse hydraulic drives are currently being used on heavy-duty construction equipment, off-highway trucks, special-purpose military vehicles and oil well servicing rigs.

The Westinghouse torque converter is based on the Schneider single-stage system which provides highest efficiency over an extended operating range.

Because Westinghouse manufactures drive components, and not end products, you are assured complete confidence on your advanced design planning. For more information write Westinghouse Electric Corporation, Gearing Division, Pittsburgh 1, Pennsylvania. J-07353

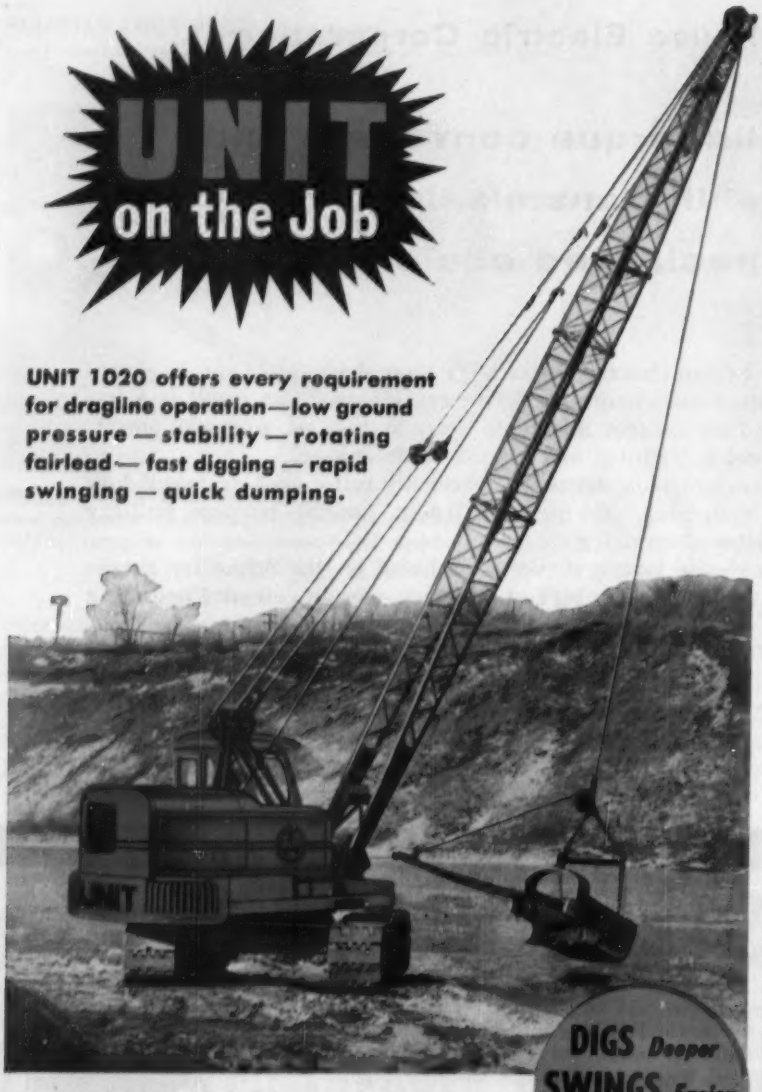
Developed to meet your special needs in earth moving, construction and materials-handling equipment.

(1) Westinghouse single-stage torque converter showing simplicity of basic parts. (2) Matching equipment requirements, Westinghouse engineers analyze advance design planning; result (3), a typical Westinghouse torque converter — power shift transmission package.

1 2 3

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TELEVISION AND RADIO!


UNIT
on the Job
UNIT 1020 offers every requirement for dragline operation—low ground pressure — stability — rotating fairlead — fast digging — rapid swinging — quick dumping.
UNIT
DIGS Deeper
SWINGS Easier
LOADS Faster

Perfectly balanced for long boom operation, the UNIT 1020 is ideal for general excavation work, sand and gravel pits, irrigation, drainage and stripping operations. Available with UNIT TORQUE DRIVE, this machine gives you smooth performance, eliminates "shock loads", cuts fuel expense. Write for literature.

UNIT CRANE & SHOVEL CORPORATION
6305 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

All Models Convertible to ALL Attachments!

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributors

Koehring Co.: Western Tractor and Equipment Co., Ltd., will handle Koehring equipment in the Canadian province of Saskatchewan. Located in Regina, with a branch office in Saskatoon, Western Tractor succeeds W. F. Fuller Machinery Co., Ltd., as exclusive Koehring representative in the area. George Solomon is president of Western Tractor.

Stoody Co.: A change in distributorships in the mid-west has been announced by Stoody, manufacturers of hard-facing alloys. Hard-facing Sales & Engineering Co. has been appointed exclusive distributor for the territory including the northern third of Illinois, the southeastern section of Wisconsin, and the northwestern portion of Indiana. The territory includes Chicago, Milwaukee, Dubuque, Davenport, and Gary.

Clark Equipment Co.: Two firms have been appointed distributors for Michigan excavator cranes. Buran Equipment Co., Oakland, Calif., and Sierra Machinery Co., Inc., Reno, Nev., are new distributors in California. Michigan cranes and Michigan tractor-shovels will be handled by the following: N. C. Ribble Co., Albuquerque, N. Mex., in six New Mexico counties; and Anderson Equipment Co., Inc., Sioux City, Iowa, in 12 Iowa counties.

Nebraska Tractor & Equipment Co.: W. R. Reisser is manager of Nebraska Tractor's new Grand Island, Neb., branch office. Jake Coffin is parts and service manager and Burt Osland is shop foreman. The firm's main office is at Omaha, Neb.

On the Sales Front

Euclid Div., GMC: Spencer T. (Wyndy) Wyndham has been appointed district sales manager for

IN CONSTRUCTION... equipment-hours saved are the same as cash!

ALEMITE
"ON-THE-JOB" LUBRICATION

1. Boosts Production! By cutting expensive downtime for lubrication—increasing output of both men and equipment!

2. Saves Money! By giving bearings top protection from dirt, dust and grit—guarding against costly breakdown!

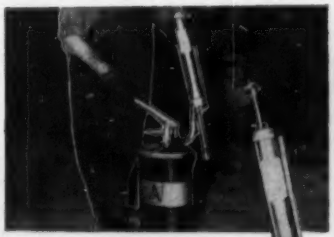
3. Saves Time! By bringing clean, fresh lubricant right to the machines—where you need it, when you need it!

• Here the sheaves of a shovel get a shot of clean, new lubricant. Operator is using Alemite Hand Gun 6243-J. This lever-type gun has plenty of power to push out old grease and dirt—capacity to serve many bearings without refilling!

Heavy-Duty Hand Gun for Toughest Lube Jobs!

Handles all pressure gun greases. Spring-primed for positive delivery. Follower rod disappears after filling. Pressure up to 10,000 lbs., lubricant capacity 24 oz. Model 6243-J.

• Alemite Loader Pump 7181-L fills a hand gun quickly—easily. Just eight strokes of the pump fill the gun completely. No mess, no waste, no troublesome air pockets. Lubricant is protected at all times from destructive dirt, dust and grit.



Loader Pump Saves Time in Refilling Hand Guns!

Clean, fast, mechanical loading of all hand guns equipped with standard Alemite Loader Fittings. Sizes to fit original refinery-filled 120- and 400-lb. drums, or 25- and 35-lb. buckets. Model 7181-L.

• The track support rollers of this power shovel are getting positive lubrication protection from this Alemite 6521-B Tractor Bucket Pump. 35-pound capacity means less time wasted in refilling, and lubricant reaches bearings "refinery clean." Fast—efficient!

Bucket Pump—Built Specially for Construction Work!

Sturdily built to give rugged construction industry service. Handles all regular pressure gun or gear lubricants. Develops 3,000 psi pressure. Delivers 1 lb. in 17 strokes. Tank holds 35 lbs. Model 6521-B.

ALEMITE, Dept. "-95
1850 Diversey Parkway,
Chicago 14, Ill.

Gentlemen: Please send me your FREE illustrated booklet showing Alemite "On-the-Job" equipment and containing complete information on Alemite lubrication methods.

Name _____

Company _____

City _____ Zone ____ State _____

ALEMITE

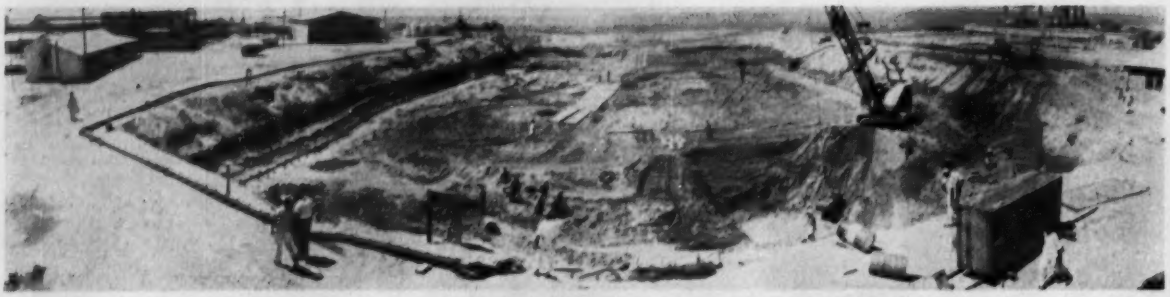
REG. U. S. PAT. OFF.

Products of **STEWART-WARNER CORPORATION**

A PRODUCT OF SW STEWART-WARNER

*In the State of Washington heavy rainfall maintains a very high water table yet the Stang wellpoint installation and supervision kept a 6½-foot x 9-foot nearly vertical walled trench completely dry.

FROM PUYALLUP* TO PAKISTAN...



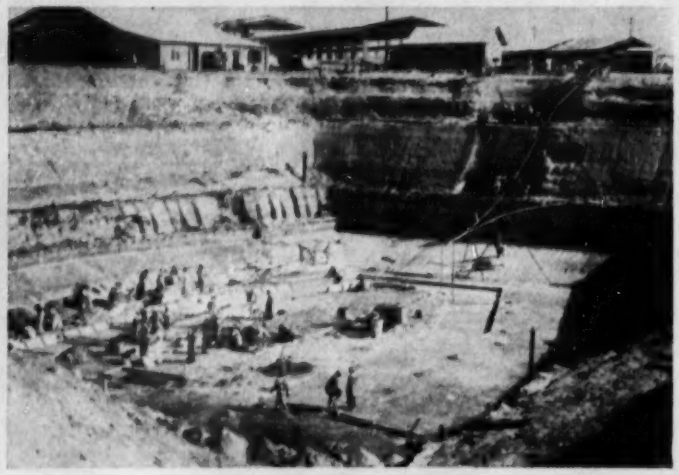
STANG KEEPS WET JOBS DRY!

Water is where you find it... but, in the construction business, all too often you find water where you don't want it. That's when the Stang dewatering services and equipment can help you—whether your water problem is in Puyallup, Pakistan, or on your own job.

Whatever your water handling job calls for—*call Stang*. Nationwide depots and an experienced foreign service are on constant standby to put your job on a sound, dry footing.

Don't risk delay on your job; choose the right method the first time—call in our Representative. He will supply you with a thorough and accurate analysis of your problem and the Stang recommendation for a speedy, economical solution.

Write for bulletin 100A



This 150-foot by 400-foot drydock in Karachi, Pakistan, being built for the Pakistan Industrial Development Corp. (Swissboring Overseas Corp., Ltd., Contractor) called for an excavation 40 feet deep with a 32-foot water table—only 50 feet from the water's edge! Dewatering of the job was quickly and efficiently accomplished by a specially engineered installation of Stang wellpoints, supervised by a Stang field engineer. Just one more example of Stang's outstanding water handling services to contractors the world over.

Putting water in its place

JOHN W. STANG CORPORATION

Engineers and Manufacturers of Dewatering Equipment, Wellpoint and Pumping Systems
Dewatering Planning—Equipment—Service

563

BELL, CALIFORNIA	OMAHA, NEBRASKA	TACOMA, WASHINGTON	TULSA, OKLAHOMA
8221 Atlantic Avenue	2123 South 56th Street	2339 Lincoln Avenue	4026 South Urbana Street
Telephone: LUdlow 2-7421	Telephone: Walnut 7796	Telephone: Broadway 4362	Telephone: Riverside 2-6929

SALES AND SERVICE . . .
Continued

the territories covered by P. L. Crooks & Co. in Oregon and Washington; Evans Engine & Equipment Co., Washington and Alaska; and Dietrich-Collins Equipment, Ltd., in British Columbia and the Yukon territory. Wyndham's headquarters will be located at Seattle, Wash.

H. K. Porter Co., Inc.: Karl F. Ewerhardt has been appointed to the newly created position of assistant general sales manager of Leschen Wire Rope Div., H. K. Porter Co. Previously Leschen's advertising manager, he will expand his activities from advertising and sales promotion to the broader activities of the general sales office.

Universal Atlas Cement Co.: The appointment of William W. Burnham as assistant sales manager of the Philadelphia territory has been announced. A member of Universal's organization since 1947, Burnham was assigned to the Dayton, Ohio, sales office.

Syntron Co.: Wallace P. Smith is in charge of Syntron's new West Virginia Sales Co., located at South Charleston, W. V. Named vice president of the new company, Smith will cover parts of West Virginia, Virginia, and Kentucky.

Lancaster Pump and Mfg. Co., Inc.: Howard Alsop, recently appointed direct factory salesman, will serve distributors in Georgia, North Carolina and South Carolina for Lancaster. His office is located at Charlotte, N. C.

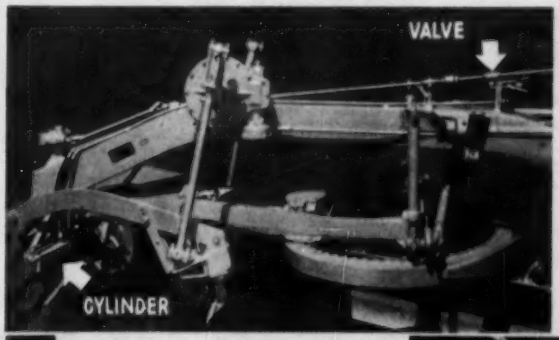
In The Main Office

Detroit Diesel Engine Div., GMC: Clyde W. Truxell, former works manager of Detroit Diesel Engine Div., has been appointed general manager of the division. He succeeds Semon E. Knudsen, who is now general manager of GM's Pontiac Motor Div. Truxell has been associated with Detroit Diesel since 1932, when he was appointed a member of the research staff.

Thew Shovel Co.: Waid V. Clark, secretary-controller and a director of the company, has been elected Treasurer, it was announced recently by C. B. Smythe, president.

Heltzel Steel Form and Iron Co.: William J. Kirchner has been

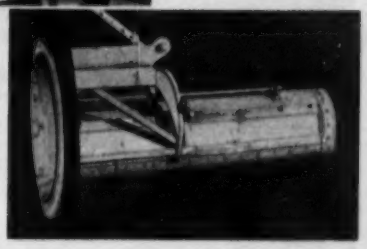
'CAT' 'GRADER COST-CUTTERS



-BOTH FOR LESS THAN $600

1. FULL-TIME POWER STEERING

Fits any "Cat" 'grader—212, 112 and 12 (including 9K) . . . cuts job time, improves quality. Valve high above dust and hazards . . . wheels held in any position . . . no wheel whip. Fully hydraulic, easy to install, minimum of working parts, Vickers pump. Ask any "Cat" Dealer or write us.

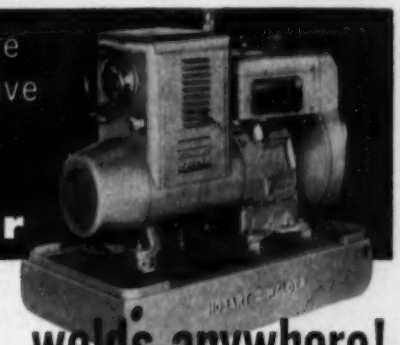


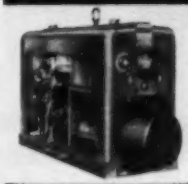
2. HYDRAULIC MOLDBOARD SHIFT

Fits any "Cat" 'grader with sliding moldboard. Touch of button shifts moldboard from inside cab . . . whether 'grader is moving or not . . . stops and locks at any point. Ask any "Cat" Dealer or write:

Ravinius INC. Dept. 100
EUREKA, ILLINOIS

lightweight, portable
air-cooled engine drive
HOBART
arc welder





250 amp. "Contractor's Special" water cooled welder

AC Power AC Welder Combination welds or runs tools, lights, motors

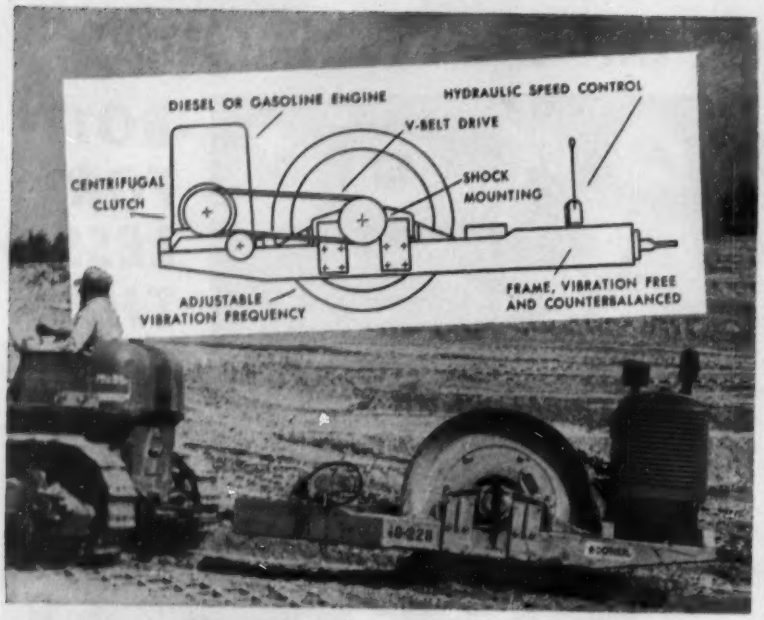
...weld's anywhere!

You'll save hundreds of dollars by having this husky arc welder on the job. Your own men can do the welding with this Hobart and the new simplified controls. It's easy to use and always ready on a moment's notice to go to work for you. Saves on replacement parts—keeps equipment working and avoids costly delays and down-time. There's a size and type to meet your particular requirements. Mail the coupon below for complete information, without obligation to you.

• Only in Hobart do you get the wide variety and choice of modern engine driven arc welders—backed by "Successful Manufacturers since 1893"

Use the coupon no obligation

• To HOBART BROS. CO., Box 696, Troy, Ohio
Without obligation—send complete information on the equipment I've checked below
_____amp. Capacity ☐ "Husky Boy" air cooled arc welder ☐ 250 amp. Contractor's Special ☐ Arc Welder with 110 v. auxiliary power ☐ Standard water cooled gas drive
NAME _____ POSITION _____
FIRM _____
ADDRESS _____

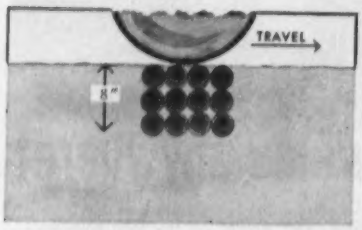


NEW CONCEPT IN COMPACTION!

VIBRO-PLUS **TERRAPAC**

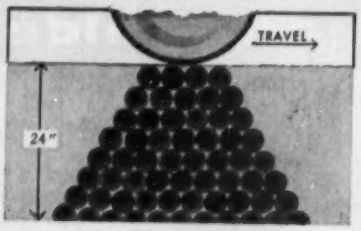
VIBRATORY ROLLER

"Terrapac" compacts faster, better and deeper in fewer passes than ordinary 30-50 ton rollers yet weighs only 3½ tons. Saves hours of valuable time because maximum density can usually be achieved in only 2 passes . . . Light enough to be easily handled on any fill or for quick transport . . . Also useful as a static roller if desired.



CONVENTIONAL STATIC COMPACTION

Rollers relying on weight alone produce friction forces between individual soil particles that prevent densification at any great depth.



TERRAPAC DYNAMIC COMPACTION

Vibratory forces, transmitted to soil in all directions, reduces friction — facilitates relocation of particles at far greater depths.

An actual field test under State Highway supervision showed that a specified 100% standard proctor density could be obtained at a 24" depth after 2 passes with a "Terrapac" . . . A 15 ton smooth roller required 20 passes to obtain specified density at only an 8" depth!

VIBRO + PLUS

PRODUCTS, INCORPORATED

STANHOPE, NEW JERSEY No. 41-6

SALES AND SERVICE . . .
Continued

named chief engineer. He succeeds Fred Mittelstadt who retired earlier this year. Kirchner has been a design engineer, field engineer, and supervising engineer of bin design in his seven years with Heltzel.

Special Mention

LeTourneau-Westinghouse Co.: A $9,000,000 building and tooling program has been announced by president Merle R. Yontz. A major part of the program is the construction of a 300,000 sq ft factory building to adjoin the present site of one of LeTourneau-Westinghouse's Peoria plants. The company is also expanding plant operations at Toccoa, Ga., and at Indianapolis, Ind.

Mack Trucks, Inc.: P. O. Peterson, president of Mack, and H. O. King, president of Brockway Motor Co., announced recently that an agreement has been signed whereby Mack acquires the Brockway truck business. Mack will take over all of Brockway's manufacturing, sales, and service facilities under terms of a purchase-rental agreement, and will carry on the business as a separate division. The merger brings together two of the oldest truck manufacturing companies.

Euclid Div., GMC: A new 16-mm color film called "Contractors' Decision" features the S-18, an overhung engine type 18-yd scraper. The sound film covers the three major concerns of a contractor who operates scrapers — performance, dependability, and component accessibility for ease of maintenance.

Associations

American Concrete Institute: The 9th annual regional meeting, to be held Oct 24-25 at the Sheraton-Mount Royal Hotel, Montreal, Canada, will emphasize concrete construction problems encountered in eastern Canada and the northeastern U. S. An entire session on prestressed concrete and lift-slab construction will be included, as well as a symposium on winter concreting. Also planned are several inspection trips to the Montreal section and the Barnhart Island power development site of the St. Lawrence seaway project. General chairman of the meeting will be Gerald Milsom, president, Metallicrete Floor Co., Ltd., Montreal.

YEARS LATER . . .
THIS "SKIN PROTECTED" SCAFFOLD WILL ERECT FAST-AS-NEW

Think what happens to your scaffolding on an everyday job and you'll realize it, too, has a "skin protection" problem. It gets battered, dented, scratched, and then rained on—and when that happens, it gets rusted—*IF* you're not using new dichromate galvanized Ezebilt. When it gets rusty like the section at right, it takes your crews a lot longer to set up and dismantle—and that's lost profit! Universal's new dichromate galvanizing eliminates all rust problems with an *extra* protection that goes on every single component. Further, this coating gives a lastingly smooth surface that lets the parts assemble faster, and makes the scaffold look better on the job (because of its gold color). And best part is that it doesn't cost any more!

Universal has a brand new catalog . . .

It tells the whole story about dichromate galvanizing. Just write for your copy.

UNIVERSAL MFG. CORP., ZELIENOPLE 6, PA.

UNIVERSAL *the only* GALVANIZED SCAFFOLD

Construction Equipment News . . .

Marion's 35-M New From Tracks to Boom Point

Marion's 35-M excavator, a new rig from tracks to boom point, incorporates many of the features found on Marion's larger units. As a crawler shovel, the unit is rated at ¾-yd, and as a crawler crane it has an 18-ton rating. A truck-crane version is rated at 25 tons. Principal design features include fast and easy convertibility of front-end equipment without basic machinery changes, air controls, and self-cleaning crawlers with shoes spaced close together to prevent material from wedging in. Independent boom hoist power is standard. Optional equipment includes torque converter, high gantry for booms over 55 ft, and power-removable counterweight.—**Marion Power Shovel Co., Marion, Ohio.**

TerraTrac's Backhoe Digs 12½-ft Deep

A new backhoe for the model 500 TerraTrac crawler has a 12½-ft digging depth, 18-ft reach, 13-ft dumping height, and 90-deg bucket rollback. An outstanding feature is its full 180-deg boom-swing controlled by a hydraulic foot pedal so that the operator's hands are free to work the boom and bucket. Buckets from 17 to 24 in. are available. The streamlined boom, which protects hose lines, has a lifting capacity of 3,000 lb.—**American Tractor Co., Churubusco, Ind.**

Pushes 3½-in. Pipe

With the Pow-r Mole, which replaces the bucket of a hydraulic backhoe, one man can dig a trench, attach the unit, and push or pull pipe up to 3 in. dia. It delivers a 4-in. stroke.—**Pow-r Devices, Inc., Clarence Center, N. Y.**

Rock Bolt Holds 40,000 lb Pull-Out

A new type ¾-in. rock bolt is said to sustain loads up to 40,000 lb pull-out in hard rock. The anchoring end has a forged wedge head and an expansion shield. When the nut is tightened on the exposed end, the wedge is pulled through the shield and anchors in rock. Two to eight ft lengths are available.—**Republic Steel Bolt & Chain Div., Cleveland 13, Ohio.**

Compacting Finisher Has Two Screeds

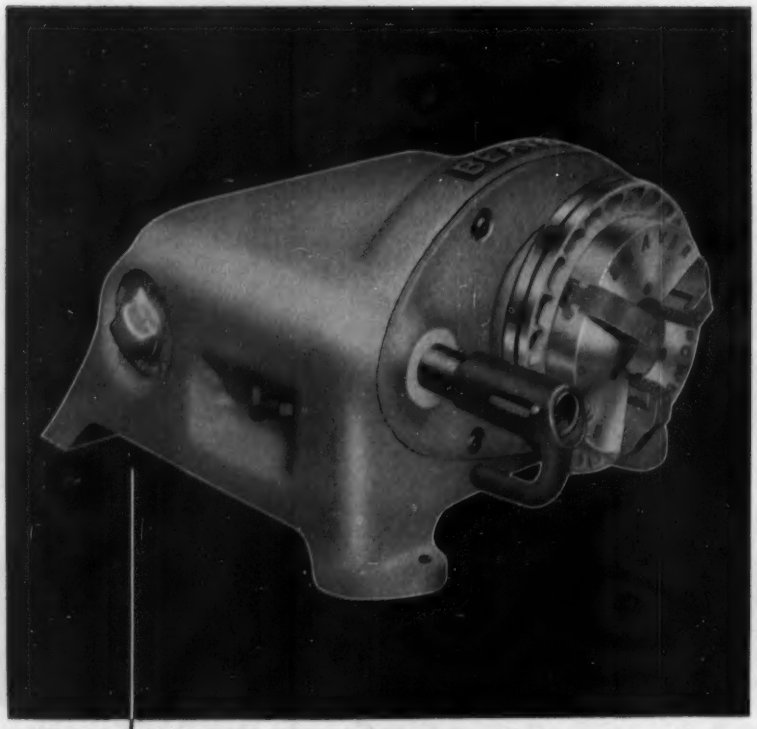
General's 5-S compacting screed finisher, with two 16 in. wide screeds, handle slabs up to 32 ft wide. Hydraulic screed control, instant reversing, and a built-in transportation rig are some of its features. A 32-hp engine gives six travel speeds. Adjustments are from 10 to 15, 12 to 18½, 20 to 26, and 20 to 32 ft. —**General Road Machines, Niles, Ohio.**

Excavator-Crane Now Has 25-Ton Capacity

Increased rating to 25 tons and a new chassis with Clark's power train are features of the redesigned Michigan T-24 excavator-crane. The power train consists of Clark-built five-speed transmission, two-speed transfer case, and planetary wheel drive axles. With a 160-hp engine, maximum travel speed is 39 mph. GVW is 51,000 lb as a crane. Maximum boom length is 100 ft and 15 to 30 ft jib booms are available.—**Clark Equipment Co., Benton Harbor, Mich.**

Versatile Hammer

Weighing only 12 lb 13 oz, the H 54U electric power hammer delivers 1900 blows per min. Accessories include chisel blanks and star and carbide drills.—**Ingersoll-Rand Co., 11 Broadway, New York, N. Y.** *(Continued on next page)*



THE NEW

BEAVER

Porto Mite

Super Drive

THE WORLD'S LIGHTEST 4-LEGGED POWER DRIVE!

TREMENDOUS POWER AND RUGGEDNESS!

WEIGHS ONLY 84 POUNDS!

● A one-man unit with four-legged stability . . . gears lubricated for life . . . lighter but more rugged . . . entirely new throughout . . . faster, more powerful, completely new greatly improved motor . . . quick-acting Power Grip Wrenchless Chuck . . . positive grip forward and reverse . . . instant and accurate, easy setting rear guide eliminates double chucking . . . motor and switch fully protected . . . all parts accessible for minimizing upkeep and maintenance . . . power to spare to drive geared tools up to 12" . . . smooth, streamlined, polished aluminum housing.

Get all the facts about the New Beaver Porto-Mite Super Drive. Write for Bulletin No. PM 56 Now!

THREADED PIPE: It's Tight—It's Best—Costs Less

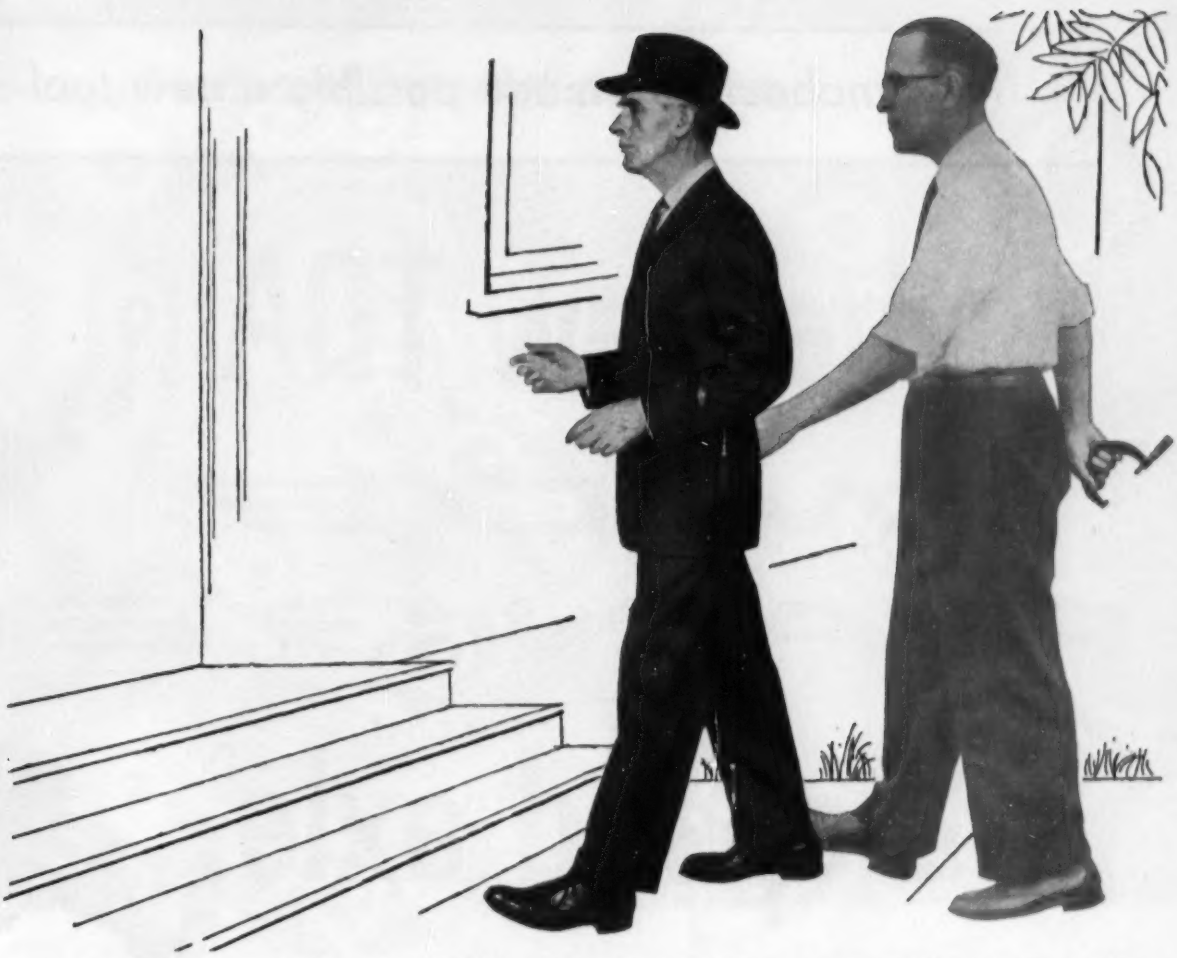
BEAVER PIPE TOOLS

223-400 DANA AVE. • WARREN, O., U. S. A.

"55 Years of Highest Quality"

RUGGED SAW — The 8¼-in. model 528 Speedmatic saw, powered with a rugged 11-amp Universal ac-dc motor, cuts to a depth of 2⅞ in. at 90-deg blade angle, and to 2 1/16 in. at 45 deg. Idle blade speed is 6,300 rpm, and under load the speed is 3,425 rpm. Features include a telescopic guard that prevents jamming, even on compound miters, and eliminates drag throughout the entire cutting cycle; and an exclusive calibrated depth gage that eliminates guesswork as to the depth of cut. The saw provides an air blast to blow sawdust off to the right of the operator to keep the cutting line clear. Another feature is the kickproof clutch, which automatically puts the saw into neutral if the blade should jam or pinch. This eliminates dangerous kickback, prevents the motor and switch from burning out and also protects the gears and other parts. Bevel adjustment can be set in seconds to allow the saw to cut at any angle from 45 to 90 deg.—**Porter-Cable Machine Co., 79 Exchange St., Syracuse 8, N. Y.**

HANDY VIBRATOR — The compact design of the UniViber electric vibrator makes it particularly useful for small pours. Design features include a 10,000-rpm motor housed in the head, a flexible casing without moving parts, and a switch conveniently located in the casing. Wires leading to the motor are pro-



Your Wickwire Rope Distributor and our die maker... ready to serve you

This die maker—one of the skilled technicians responsible for the quality of our rope wire—is with your Wickwire Distributor every time he makes a call.

True, he's physically in our plant, working to tolerances of 1/10,000 of an inch as he fashions the super-hard carbide dies used to produce every foot of rope wire. But, whenever your Wickwire Distributor makes his call, he has the full assurance that *every* wire in the product is exactly the size it should be and has a smooth, silky surface finish. This careful attention helps assure a rope which will perform successfully.

It's just one more reason why your Wickwire Distributor knows he's got top-quality rope, slings and strand to sell . . . and that these products will serve you well.

CF&I WICKWIRE ROPE A CF&I PRODUCT

4083

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

The turnabout that made possible a new tool

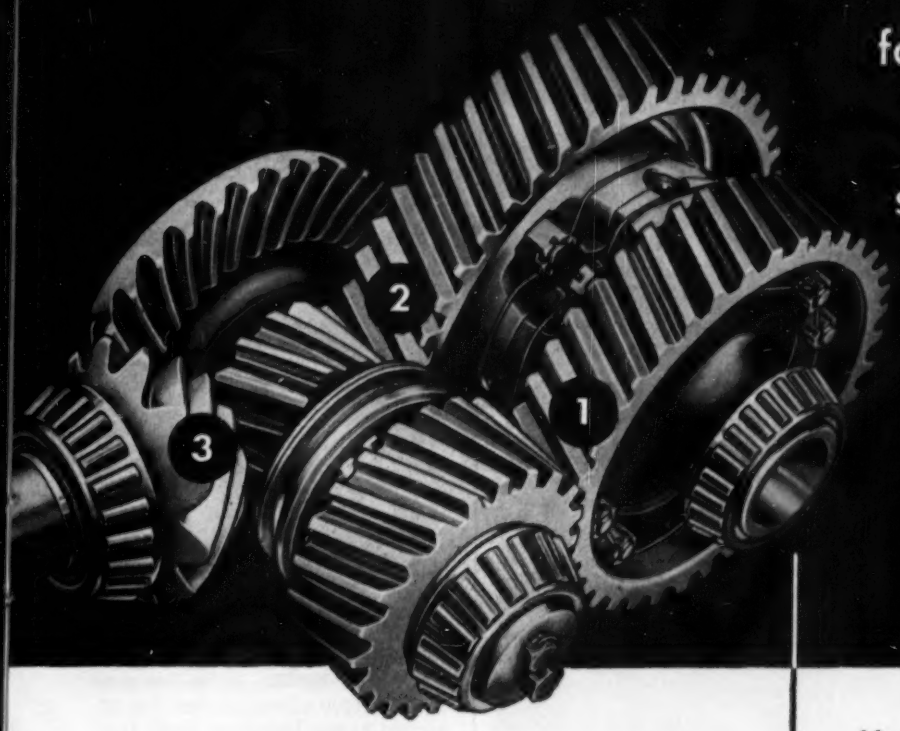
the new TDA®

WIDE RANGE®

2-speed axle

A new member of the famous TDA 2-speed axle family

for application of automotive power...



for operations requiring short transmission steps and high over-all gear reduction

The new TDA WIDE RANGE 2-Speed Axle (available in both 2 to 1 and 2½ to 1 ratio spreads) offers all the highly desirable advantages heretofore available only through the use of complex multiple-speed transmissions or auxiliary gear boxes, without many of the penalties of either one or the other:

WITHOUT laborious two-stick shifting.

WITHOUT wasteful excessive weight.

WITHOUT increased driver fatigue.

WITHOUT unusual wheelbase limitations.

WITHOUT higher initial vehicle cost.

WITHOUT higher maintenance cost.

WITHOUT excessive wear on the lower speed gears of the transmission.

WITHOUT restricted over-all gear reduction.

WITHOUT complicated shift patterns.

For complete information on the new TDA WIDE RANGE Axles now available, call, wire or write your nearest vehicle dealer or branch.

Here's the simple switch that turned the trick!

The broader range of the new Timken-Detroit® WIDE RANGE 2-Speed Axle was achieved by a fairly simple mechanical rearrangement. We "flipped" our high-range (1) and low-range (2) helical gear sets—reversed their relative positions—to place the enlarged helical pinion of the high-range gear set where it would not interfere with the hypoid pinion (3) of the first-reduction gear set.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

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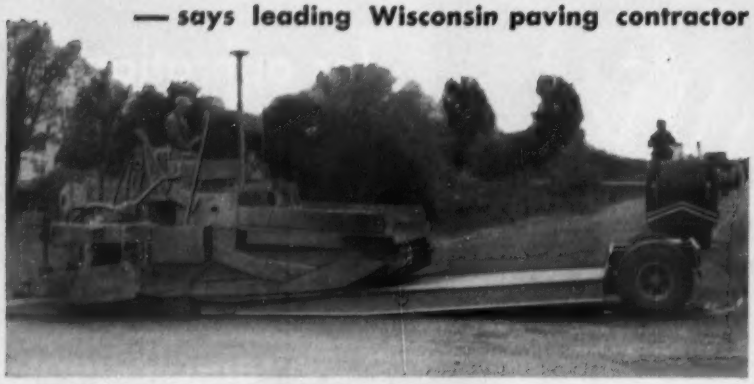
TIMKEN Detroit AXLES

ROCKWELL SPRING AND AXLE COMPANY

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

"Best Method we've found for moving blacktop pavers"

— says leading Wisconsin paving contractor



MATHY CONSTRUCTION CO.—who lay an average of 260,000 tons of blacktop pavement in one season — claim they have speeded operations considerably by using a new *front-loading* Model LXP LaCrosse trailer to transport pavers, rollers and other equipment.

Big time-saver

According to President A. L. Mathy, "The quick-loading and unloading feature of this new LaCrosse low-bed, plus the fact that it can be hauled by *any* truck or water wagon with a towing hitch, saves time *re*-turning paving equipment for second pass, as well as moving between jobs. We especially like the LXP's *low price* . . . low loading height . . . and smooth 'cushioned ride' which eliminates jolting shocks."

Unique features

Secret of the LXP's unique design is a *self-contained power system* plus a simple sheave-type hitch and cable-lift arrangement, which permits operation behind any standard truck — *regardless of whether or not it has a hoist.* A motor-driven hydraulic pump and ram underneath the trailer bed supplies power for lowering trailer platform to *7" height* — for fast loading or unloading over front end with one man.

Front-loading LaCrosse LXP low-bed hauls behind any standard truck, water wagon or other utility vehicle on the job.

Two sizes

Available in 8 or 14-ton capacity, the new LaCrosse LXP trailer has a full platform width of 8', with a deck height of only 20" in travel position. Big 12¼" x 6" brakes, one-piece main beams, lengthwise decking and other proven LaCrosse features are STANDARD. See your LaCrosse distributor for full details today, or write LaCrosse Trailer Corp., LaCrosse, Wis.

LC-38

"Better Living Through Better Roads"

91 YRS. metal fabricating experience

LaCROSSE

VALUE LEADER IN LOW-BED TRAILERS

tected by the flexible casing which also functions as a convenient handle. Two types of 3-in. dia heads are available, the model 1M3R replaceable rubber tip head and the model 1M3 steel nose head. Both heads include a one-piece eccentric weight that is tapered to produce minimum vibration at the point where commutation takes place. It is mounted on open-type ball bearings. The vibrator can be plugged into any 115 v, ac or dc source.—**Viber Co., 726 S. Flower St., Burbank, Calif.**

NEW STUMPER — The Ransome Model R100 stumper can be attached to any bulldozer blade from 35 to 51 in. high. The three-pronged stumper features a clamping device that permits it to be mounted or dismounted in a matter of minutes. No alterations to the blade are required. Mounted on the front of the blade, the stumper permits the concentration of the power of the tractor and the lifting force of the dozer at the base of the stump so that it can be removed quickly without turning over soil away from the stump. It has replaceable manganese teeth.—**Ransome Corp., 2729 Hunting Park Ave., Philadelphia 29, Pa.**

WAGON DRILL — The DR40 heavy-duty wagon drill has the feed shell behind the center line of the large wheel axles to provide a more substantial drilling carriage. It also has an air motor feed that tends to stop drill steel from sticking. Designed for vertical or horizontal drilling in hard formations, the DR4O is lightweight, which makes it maneuverable in rough terrain. Added strength is obtained through the use of a light,

Announcing...

the amazing light-weight, compact

85 cfm GYRO-FLO

PORTABLE ROTARY COMPRESSOR

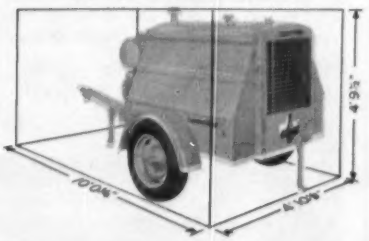
A new addition to the famous GYRO-FLO compressor line, this amazingly compact rotary delivers 85 cfm at 100 psi. It is by far the lightest portable compressor built in comparable capacity. Weighs only 1840 lbs—ready to go—fully equipped with tool boxes, fenders and two-wheeled spring-mounted running gear.

As a truck-mounted unit, the 85 GYRO-FLO weighs 1375 lbs and stands 42 in. high.

For your smaller jobs that need only 85 cfm of air power, this GYRO-FLO is certainly your best bet. It gives the same smooth, dependable, maintenance-free performance that characterizes GYRO-FLO compressors the world over.

With this new unit, the GYRO-FLO line now is increased to six sizes—85-125-210-315-600 and 900 cfm—the most complete line of portable rotary compressors available. See your Ingersoll-Rand representative for further details.

A LOT OF POWER IN A LITTLE SPACE

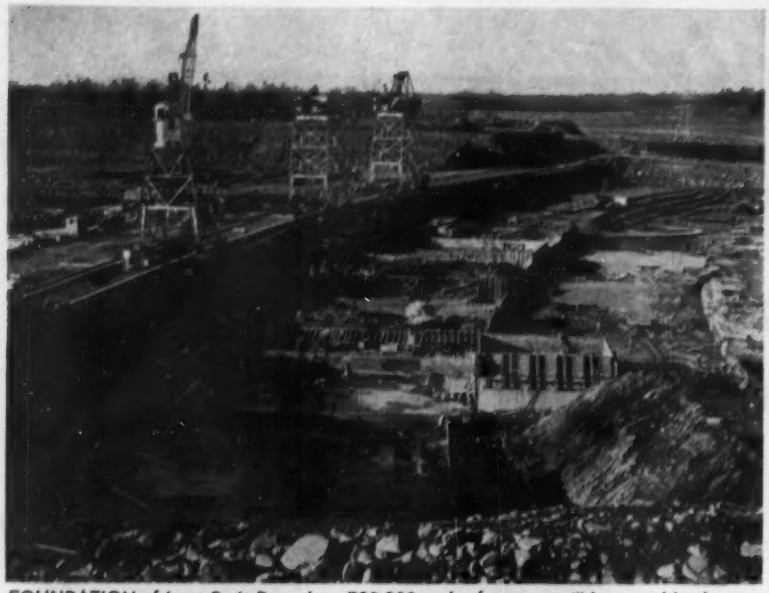


Ingersoll-Rand

2-432 11 Broadway, New York 4, N. Y.

An unbeatable combination...
GYRO-FLO Compressors and I-R Air Tools

Here's the complete line of GYRO-FLO heavy-duty portable compressors ...6 SIZES



FOUNDATION of Long Sault Dam where 700,000 yards of concrete will be poured by the contractor—Walsh, Perini, Morrison, Kiewit, Utah Companies, Massena, New York.

AGGREGATE TUNNEL CUTS COST OF VOLUME CONCRETE MIXING... ST. LAWRENCE SEAWAY PROJECT

Material handling is a major problem on projects such as the Long Sault Dam on the new St. Lawrence Seaway. Here is a job of such magnitude as to require more than 2400 cubic yards of concrete per day to keep the work rolling.

To handle the necessary aggregates, the contractor constructed, at some distance from the dam site, a tunnel within which a conveyor carries the aggregate to a batch concrete mixer. This tunnel, built right on the job with Commercial Shearing and Stamping steel liner plates, is large enough to accommodate the conveyor belt and walkway for feeder operators.

Placed at intervals in the tunnel roof are openings through which the aggregate flows by gravity from the stockpile directly overhead and which completely covers the tunnel. Feeders installed at intervals in the tunnel roof control the gravity flow of the aggregate from above.

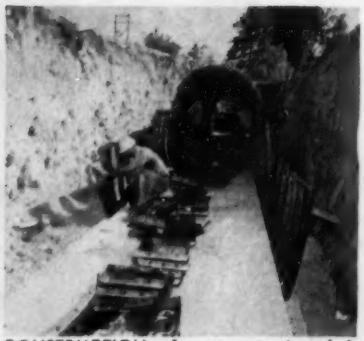
Feeder operators working inside the tunnel control the material flow and selection of sizes to obtain the proper aggregate mixture reaching the conveyor. The belt carries the aggregate to the batch mixer for the addition of cement, water and mixing into concrete.

Commercial Shearing and Stamping liner plate was selected for this job because of its ability to withstand the most severe overhead loads, and to provide maximum protection from collapse and cave-in. In addition, the ease of constructing and disassembling Commercial liner plate tunnels make it possible to move or salvage the entire tunnel. This method of large scale aggregate handling, as done at the Long Sault Dam project, is being profitably used by contractors on other major projects.

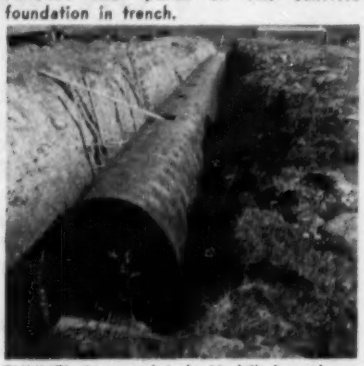
Commercial Shearing and Stamping steel liner plate is available in a wide size and gauge range. For complete details on how Commercial can help solve your surface or sub-surface tunnel problems write to Dept. B-36. The Commercial Shearing and Stamping Company, Youngstown, Ohio.

COMMERCIAL *shearing and stamping*

YOUNGSTOWN, OHIO
CHICAGO, ILLINOIS
SALT LAKE CITY, UTAH

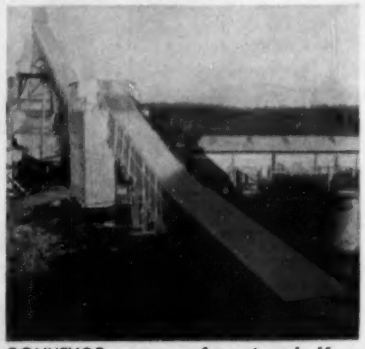


CONSTRUCTION of aggregate tunnel is quick and simple. Workmen install Commercial's liner plates on this concrete foundation in trench.

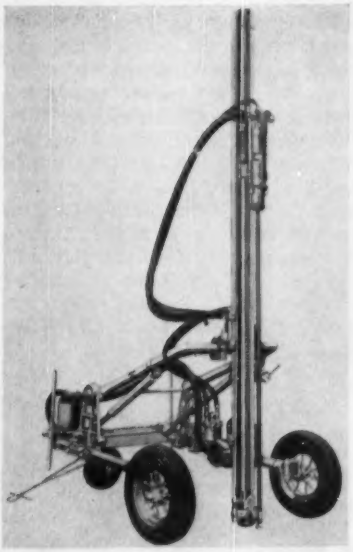


TUNNEL is completed. Unskilled workmen have used only 7 inside bolts to hold each plate. Note aggregate feeder openings.

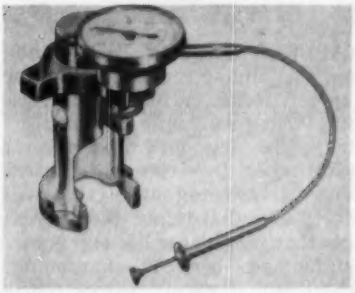
AGGREGATE, stockpiled on top of tunnel, flows by gravity onto belt conveyor inside tunnel as operators open feeder gates.



CONVEYOR emerges from tunnel (foreground) and feeds aggregate into batch mixer for final processing into concrete. Trucks then haul concrete to dam site without time loss.



welded tubular U bar that allows drilling in almost any position. The entire unit, including feed shell and D14DR, 4-in. drifter, weighs only 1,500 lb. The 4-in. drifter is recommended for use with the new wagon drill. It is used with a 13-ft feed shell weighing 400 lb and it has a feed travel of 10 ft. Standard equipment for the drill includes a two-gal line oiler, two 6.00x16 tires and one 4.00-8 caster tire. The adjustable swivel wheels are easily locked into position for line or face drilling—**LeRoi Div., Westinghouse Air Brake Co, Milwaukee 1, Wis.**



CHECKS TIMING — The new model 300 Valve-Gapper removes the human element from valve adjustment jobs. The Valve-Gapper uses a dial indicator to get exact valve clearance settings and to check the action of hydraulic lifters on virtually all overhead-valve engines. The Valve-Gapper consists of two finely machined telescoping barrels, and a dial indicator. The outer barrel fits around and over the valve spring retainer. The inner barrel fits around the valve

Kelley

. . . the finest name in concrete floor finishing equipment

For floating and finishing large areas . . .

THE KELLEY HYDRA-TROWEL

The only hydraulic trowel on the market . . . duplicates the quality of hand-troweling. Four wide dual-purpose blades are used for both floating and finishing. Blade pitch is adjusted by finger-tip control. Stationary guard ring. Low center of gravity assures great stability, eliminates drifting and gyrating. Contractors everywhere praise its effortless operation and the satin-smooth finish it puts on floors.

Write for Bulletin K-103

For floating and finishing small areas . . .

THE KELLEY BANTAM

Here's a terrific machine! Small . . . for confined areas. Light and compact . . . for extreme portability. Carry it in one hand! Fits in the trunk of your car! The Kelley Bantam Power Trowel is ideal for garages and basements and for factory repair jobs. Low center of gravity and unique blade-pitch arrangement put the Kelley Bantam way ahead of all other 3-blade power trowels.

Write for Bulletin K-107

For high-quality, dust-free concrete floors . . .

THE KELLEY COMPACTOR POWER FLOAT

Heavy-duty . . . portable . . . for compaction-floating of concrete or mastic floors. The famous Kelley Compactor scientifically floats dry-tamp topping, drives in tough and durable surface-hardening materials. A must for really good industrial floors!

Write for Bulletin K-101

For grinding surface imperfections . . .

THE KELLEY FLOOR GRINDER

A perfect machine for all general floor grinding. Developed because of increasing demands for a portable floor grinder. Serrated grinding ring is 24-grit silicon carbide, 14" in diameter.

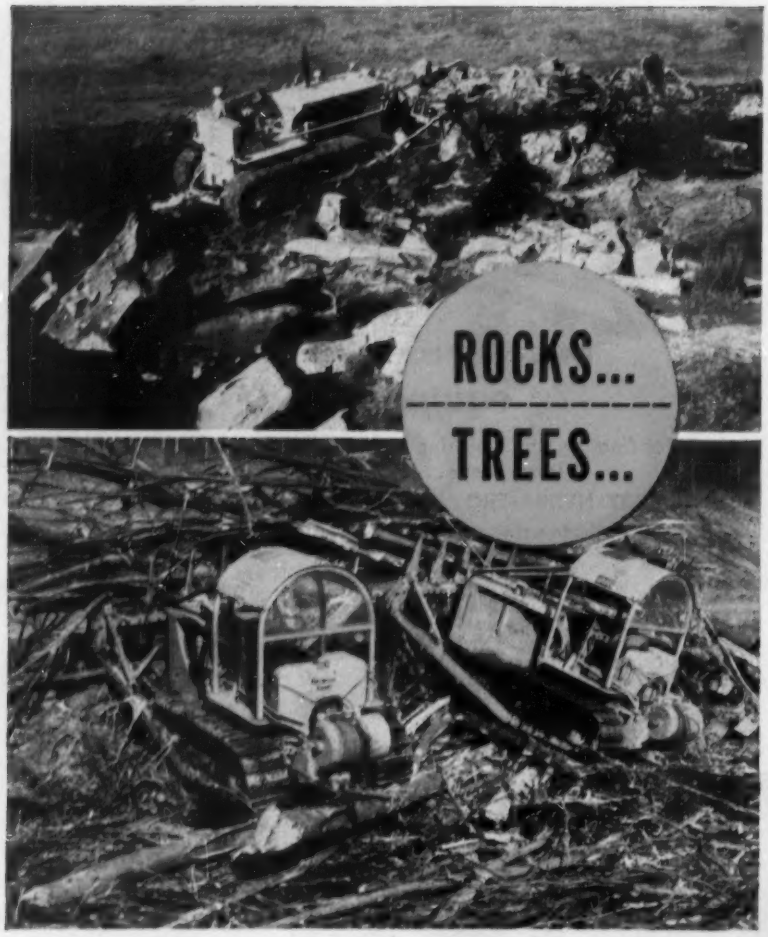
Write for Bulletin K-108

A few good distributor territories still available.

Kelley **MACHINE DIVISION**

WIESNER-RAPP CO., INC.

285 HINMAN AVE., BUFFALO 23, N. Y.



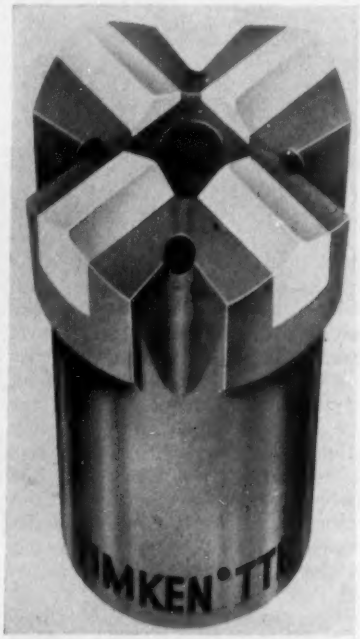
Clear them faster, cheaper with a
FLECO Rock Rake!

Does your contract call for moving rocks and pushing down and stacking trees? Fleco Rock Rakes are designed *specifically* to do those jobs faster, more efficiently and at a big savings to you! Just remove the bulldozer blade from most any crawler from the D4 size on up and mount a Fleco Rock Rake in its place — a job ordinarily done in 15 minutes to half an hour. A Fleco Rock Rake can often *double* the capacity of your crawler. Massive cast steel teeth can penetrate the ground to comb rocks, roots and limbs from the ground. Soil sifts back between teeth while material is being moved to dirt-free piles. Top Guards are available to increase the tractor's carrying capacity and protect the front of the machine. Get all the facts on the complete line of Fleco Land Clearing Equipment from your Fleco-Caterpillar Dealer.

FLECO®
CORPORATION
Jacksonville, Florida

ROCK, ROOT & BRUSH RAKES
TREE CUTTERS • UNDERCUTTERS
CAB GUARDS • ROOT CUTTERS
DETACHABLE & PULL STUMPERS
TREEDOZERS • ROLLING CHOPPERS
SUBTILLAGE TOOLS

stem, hooking under the rocker arm. An internal spring exerts upward pressure on the inner barrel, thus lifting the rocker arm away from valve stem during the time the valve is closed. The dial indicator measures this lift, which is the true valve clearance. The Valve-Gapper is designed to be used with a number of interchangeable adaptor sets that will fit the instrument to groups of tractor, truck, or automobile engines—**P & G Mfg. Co., 305 N. E. Russell St., Portland, Ore.**



TAPERED SOCKET BITS—Timken has announced a new line of tapered socket carbide insert rock bits. When used with light-air-leg drills, the new bits offer several advantages: they can be discarded without throwing away the drill steel; they have four-point cross bits that give longer life and greater footages between sharpening; and the tapered pin can be fabricated easily on the drill steel. The new bits are available in 1¼, 1⅜, and 1½-in. sizes to fit ⅞ hexagon or ⅞ quarter octagon tapered drill steels.—**Timken Roller Bearing Co., Canton 6, Ohio.**

GIANT RIPPER—A 10,830 lb, hydraulically controlled ripper has been designed specifically for use with Caterpillar's D9 tractor. The ripper, which can reach 28 in. below ground, is operated by two hydraulic cylinders working in

Michigan Model 175A owned by E. J. Petrillo, Inc., sold and serviced by United Tractor and Equipment Corp., N. Y. C.

Four-yard crawler-loader not available . . .

So Petrillo loads oversize blast rock with this 2¼ yd. Michigan

This photograph shows a section of E. J. Petrillo's contract on the New York Thruway where the contract called for removal of an old granite quarry. Petrillo used one of his 2¼-yd. Michigan Tractor Shovels to load out oversize blast rock. Some of the rock weighed as much as 6½ tons and measured close to 8 ft. wide.

Unusually tough assignment

Superintendent Tony Tangredi said that the job normally would have called for a 4-yd. crawler-loader, but the crawler-loader wasn't available. So he decided to try the Michigan, even though he considered this an unusually tough assignment for a rubber-tired machine. During the three weeks the Michigan was on this job, its performance was satisfactory in every way.

Drives job-to-job at 27 mph

Petrillo's Michigans are always on the move—loading trucks in the borrow pit, handling general clean-up work all over the job. "A big advantage to us is the maneuverability of these Michigans", says Supt. Tangredi. "At 27 mph, they get where they're needed in a hurry —and you don't need trailers to move them. On this rock-handling job, we proved that the Michigans will handle the tough assignments along with the routine jobs."

Note the size of the stones being loaded into the rear-dump.

Try it on your work

Like E. J. Petrillo, Inc., more and more owners have found that a Michigan will handle jobs which have always been considered too tough for rubber-tired Tractor Shovels. The exclusive Clark power-train — torque converter, power-shift transmission and planetary wheel drive axles—gives the Michigan more useable power and traction than you've ever seen on this type of machine. Your Michigan distributor would like the chance to prove it. Ask him to demonstrate on one of *your* tough jobs —you name it.

Michigan is a trade mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 15, Michigan

CLARK EQUIPMENT

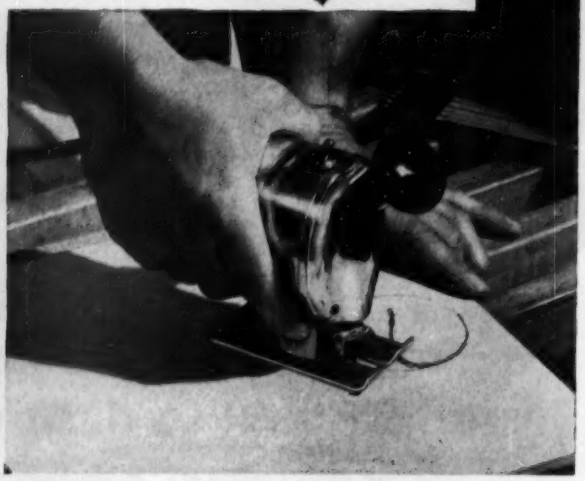
(Advertisement)

Black & Decker® Jig Saws are POWER-BUILT TO LAST!

And designed to make your installation work easier!

We don't buy motors—we build them!

The *heart* of your electric tool is the motor—completely built by Black & Decker! All the power you need and then some—because each motor is built for a specific tool and the job it must do. B&D motors always *stand up!*



New Heavy-Duty Jig Saw!

Specially made for heavy-duty installation work. Cuts intricate curves, even in heavier stock. Runs cool, in 2x4's or practically any material. Cuts to 45° angle, on either side. This versatile, rugged tool *speeds your work*, offers full 1" stroke, with minimum vibration, extra smooth performance! Heavy-duty shoe will not wobble or distort under pressure. Full line of wood and metal cutting blades available. Priced lower than any jig saw of similar capacity in its field.

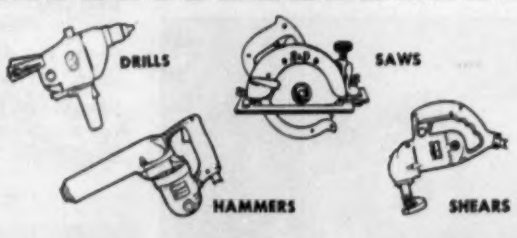
U-10 Jig Saw for lighter work!

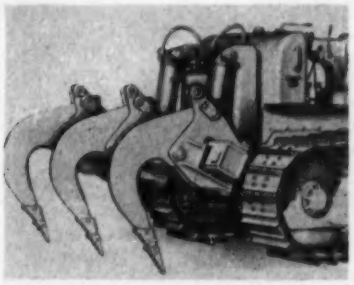
Like its heavy-duty "brother," this perfectly balanced, lightweight B&D Jig Saw makes pocket cuts, straight, curved, sharp radius and irregular cuts—follows intricate patterns easily! Has capacity to cut 1½" soft wood, 1" hardwood—ideal for your lighter, "tight-spot" jobs. Cuts practically all materials, including metal, with proper blade. See your B&D distributor, or for more complete information, write: THE BLACK & DECKER MFG. CO., Dept. 2609, Towson 4, Maryland.

SERVICE! . . . one of 44 Black & Decker factory service branches is located "next door" to you. Staffed by experts to give you fast, efficient service and genuine replacement parts.

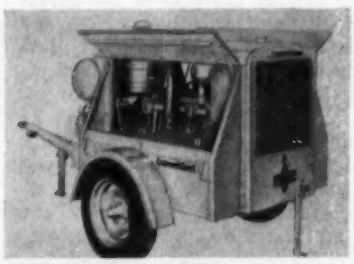
Look in the Yellow Pages under "Tools-Electric" for Nearest Outlet

Black & Decker®
PORTABLE ELECTRIC TOOLS



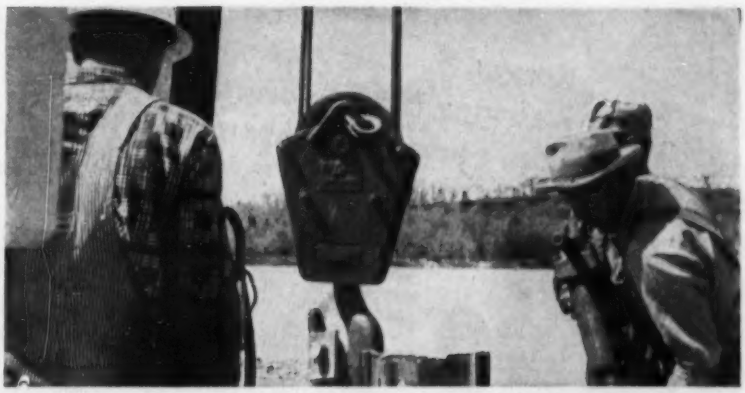


conjunction with the Cat No. 50 hydraulic control. Called the No. 9 ripper, it has a hydraulic pump that permits it to be raised or lowered independent of the flywheel clutch or the torque converter. A convenient control feature is the automatic kickout that throws the control lever back to the hold position at the end of the raise stroke. The complete ripper consists of two mounting brackets, the two hydraulic cylinders, a beam assembly, and three swivel-mounted teeth that move up to 10 deg when rocks or other obstructions are encountered. The box-section beam, 12x12 in., and 10 ft 7¾ in. long, is made of alloy steel plates that are submerged arc welded and reinforced inside with additional plates. Shanks are made of heat-treated steel. Each shank has a hardened alloy cast steel boot with a replaceable, hardened cast steel point. The ripper mounts on the bevel gear case of the D9 through a special drawbar bracket group that replaces the standard drawbar brackets. — **Caterpillar Tractor Co., Peoria, Ill.**



SMALL ROTARY — Ingersoll-Rand has added a new 85-cfm compressor to its Gyro-Flo line of portables. The Gyro-Flo 85 weighs only 1,840 lb, ready to go and fully equipped with tool boxes, fenders, and a two-wheel, spring-mounted running gear. As a truck-mounted unit, it weighs only 1,375 lb and stands only 42 in. high. The compressor is driven by a four-cylinder, four-cycle Continental M140 gasoline engine that is equipped

(Advertisement)

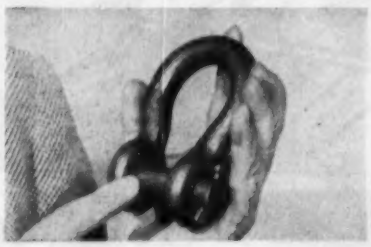


SAFETY'S ALWAYS IN SIGHT

Ever worried about your crew forgetting the rated capacity of a block? You're free from worry and they're free from danger with Crosby* "Load-Rated" Blocks because the load capacity is *embossed* in the side plates! A quick glance shows what the limits are—no chance to overload the block by mistake. Crews the world over are protected by genuine Crosby "Load-Rated" Blocks—are yours?

*REGISTERED TRADEMARK

THE RIGHT COMBINATION

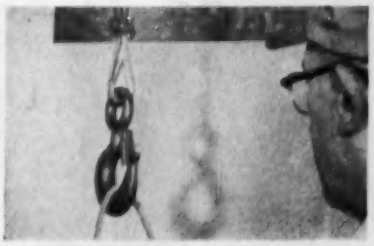


An exacting combination of design, steel and drop forging goes into Laughlin Shackles. A combination that results in maximum strength without brittleness that can result in fracture under shock load or in extreme cold! Pins used in Laughlin Shackles are forged from the same high quality steel—their extra hefty design makes them safer when shock loads accidently occur. When you see the famous Laughlin trade mark on shackles (and all other Laughlin fittings), you're seeing the mark of safety! Your nearby distributor has shackles in sizes from ⅛" to 3".

Double Clevis Link attaches ¼" to ½" chain to rings, end and sling links, eye hooks, pad eyes, tractor eye bolts and other fittings.

The world's most complete line of fittings for chain and wire rope is described in the catalog available from your distributor.

LOADS STAY PUT!



Anyway you handle it—rough or easy—your load won't come off a Laughlin Safety Hook until *you* release it! The hook is drop forged and heat treated. The fool-proof latch mechanism is made of long life stainless steel or bronze—it'll never rust, never jam! See your Crosby-Laughlin distributor for information on sizes and capacities.

LAUGHLIN LINKS INSTALLED QUICKLY

Lower downtime—fast changeover is reported by companies using super safe Laughlin Double Clevis Links to couple standard and alloy chains to fittings. Users everywhere have cut out expensive, time-consuming welding and blacksmithing in favor of simple installation. Laughlin's heat treated

Stocked and sold by leading distributors everywhere

CROSBY-LAUGHLIN *Division*

American Hoist and Derrick Company

FORT WAYNE 1, INDIANA

Correctly engineered to bear heavier loads, lengthen rope-life, reduce maintenance costs

• Because they're designed and engineered for specific tasks, you'll find MADESCO blocks with heavy steel shells and fittings your *safest* choice. In materials, in construction too, Madesco tackle blocks assure you the extra service that comes from over thirty years of specialized experience and "know-how." Buy Madesco blocks and you make substantial savings on your rope costs, because Madesco sheaves (of iron or steel graphite bronze) are correctly-grooved to prolong rope-life. Loads travel smoothly, easily, quickly to save lifting time; that means savings too that come from minimized maintenance and down-time. There's a complete line of Madesco tackle blocks for every need. Consult your industrial distributor—and meantime write for our catalog.

WORTH ASKING FOR—BY NAME

MADESCO BLOCKS

MADESCO TACKLE BLOCK CO., Easton, Pa.

Pump any liquid anywhere — with the BENNETT BIG G

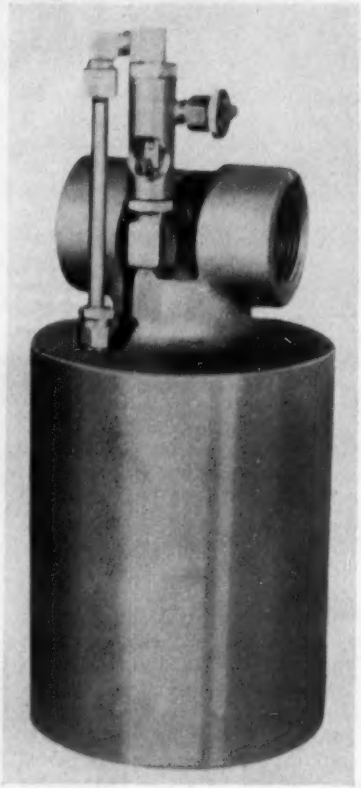
Even on the most out-of-the-way projects, liquids handling is no problem with the Bennett BIG G transfer pump. Its aluminum pistons, with automotive type rings, do away with expander springs, leathers, diaphragms and other trouble-causing construction details. Because every stroke is a suction stroke, the BIG G delivers more gallons for less work. It's available for drum mounting or with tripod mount and suction hose intake—transfers up to 20 gallons per minute (based on 100 strokes) over lifts up to 20 feet. Special models available for hard to handle liquids. Ask your John Wood Representative for details, or write:

JOHN WOOD COMPANY

BENNETT PUMP DIVISION Muskegon, Michigan

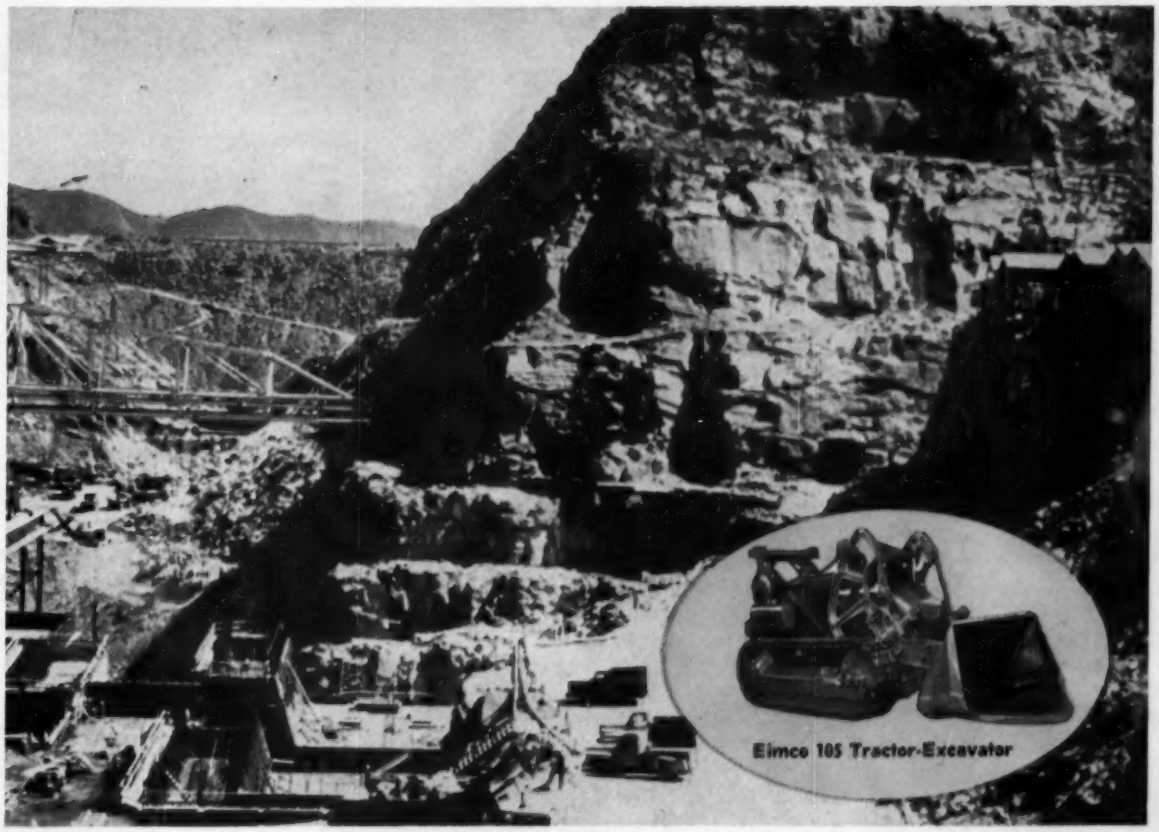
In Canada: Toronto • Montreal • Winnipeg • Vancouver

with push button starting and a 6-v electrical system. With this addition, the Gyro-Flo line of portable compressors has been increased to six sizes — 85 through 900 cfm.—**Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.**



AUTOMATIC LUBRICATOR — The Murray Sight Feed line lubricator automatically feeds and mixes the right amount of oil to lubricate air and steam tools ranging from air spades to the largest hammers. The lubricator has an adjustable valve that controls the rate of oil feed so that a drop at a time or a steady stream is pressure-fed into the line in the form of an atomized spray. There are no moving parts to jam, and flooding is impossible because oil is delivered only when the tool is in use. A built-in screen prevents clogging. Used with anti-freeze, it prevents icing. The unit has been tested successfully under pressures of 900 psi. It is available in sizes to handle air and steam tools using from 60 to over 1,000 cfm. Prices range from $45 to $85.—**Murray Equipment Co., Box 14, River Forest, Ill.**

(Continued on page 235)



INDIA – EIMCO 105's KEEP GRUELLING SCHEDULE

Two Eimco 105 Tractor-Excavators have each worked 8,000 hours in 12 months to keep progress on schedule at a huge dam project in India.

The machines have received intelligent maintenance and repairs have been small.

Eimco 105 Tractor-Dozer

At work on diversion, penstock and highway tunnels, trained Indian crews operating the 105's are doing an excellent job of tunnel driving. In some instances, advance for the size of tunnel being excavated may establish new world records.

"Eimco 105's are preferred equipment to use for tunnels of this type," says one official of a contracting firm. "The transmission, clutches and drive on both machines have not been touched in 8,000 hours of operation. They are in good condition and we expect them to last many more years."

Have you considered why the Eimco 105 is "preferred equipment" to contractors of huge dam, tunnel and road projects in the export market?

It's becauuse their dependability is reflected through their engineered strength to stay on the job around the clock – day in and day out.

The Eimco 105's dependability eliminates the necessity of a sizeable parts depot. Eimco's are built to 100,000 hour standards for service in remote areas. Time saved by Eimco's working continuously with no down time for repairs is a big factor in selecting equipment.

Conditions being equal, Eimco 105's will produce more at less cost and in less time than comparative equipment. Let Eimco show you how this versatile unit can outperform and out-work heavier, more expensive units.

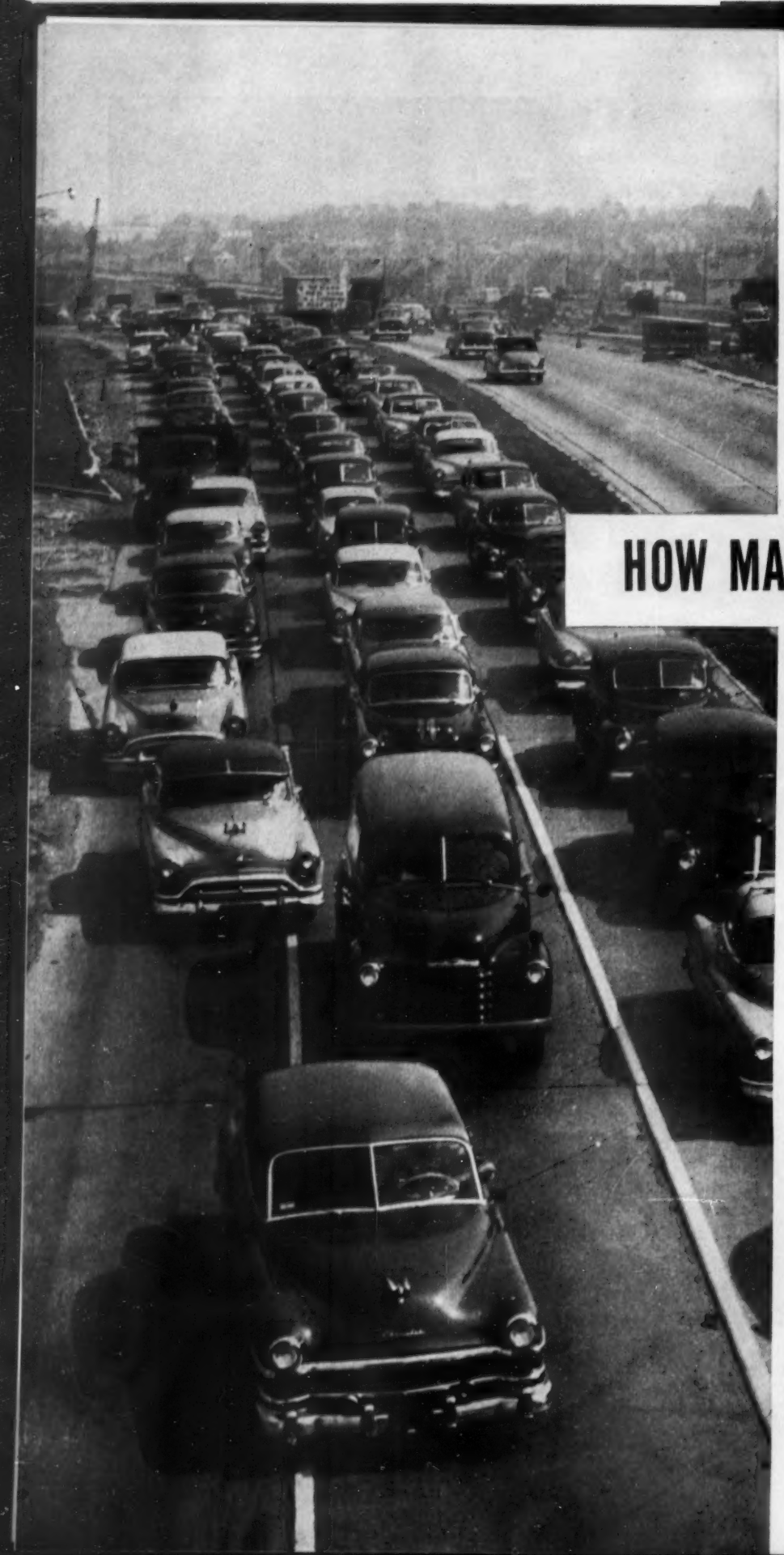
See the Eimco 105 before you buy any crawler tractor equipment.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Cleveland, Ohio Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

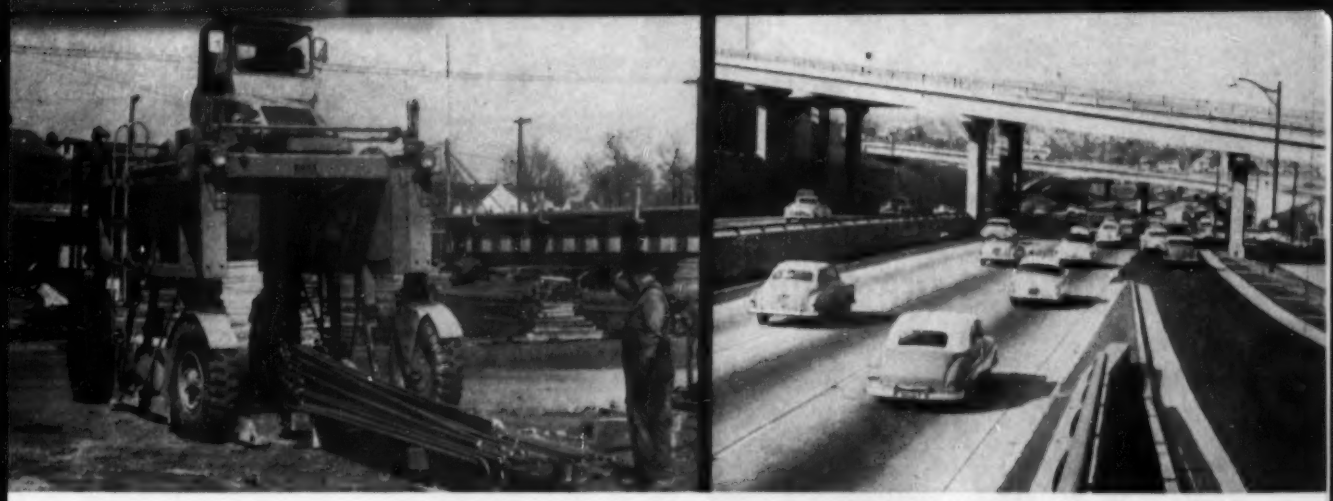
B-314



HOW MANY MILES OF

HIGHWAYS ARE EVERYBODY'S BUSINESS – ESPECIALLY YOURS

Everybody talks about highway problems, but you can do something about it. Remember, now that the money has been provided, only you and your fellow construction men can convert the dollars into highways. Be sure you're ready to do the job.



You keep informed of new machines, materials and methods all year long in McGraw-Hill's construction publications. The 1957 Road Show is another opportunity to keep yourself well-informed about the best ways to break America's highway bottlenecks.

HIGHWAY ARE YOU READY TO BUILD?

The 1957 Road Show will help you build more than you can now

WITH A MAJOR HIGHWAY PROGRAM at last under way, how many contracts will you get? How many miles of highway will you build? The answer depends entirely on how well, how fast and how economically you can build them.

The better and faster you work, the more miles you'll build. And the more economically you do it, the more you and your country will profit. But to do it, you'll need the newest equipment, the best materials, the sharpest engineers. You'll need to rely on every service available—from subcontractors to electronic brains.

The 1957 Road Show in Chicago will help you build more miles of highway than you can now. Under one roof will be shown the latest in tools and equipment, the newest methods, the new materials and the new uses for old materials, and a wide variety of services to help you do your job better, faster, and cheaper. You'll also find several thousand of your fellow roadbuilders, designers and construction experts who will be swapping experiences and ideas.

You can shop around, question the experts, line up new personnel, get an eye on the new machinery, learn new tricks and techniques that will help you get more contracts and make more money out of each contract.

Try to spend the full week there, from January 28 to February 2.

The time and money you spend on the Road Show will pay off over and over again through the coming years. Not only is it smart business for you to attend, but you owe it to your country to provide the best roads, in the fastest most economical way.

GO TO THE ROAD SHOW IN 1957

DATE: January 28—February 2, 1957

PLACE: International Amphitheatre, Chicago, Illinois

Tremendous advances have been made in the last decade. New equipment, new methods, new cost-cutting ideas, new materials and new uses for old materials, all have been developed since the last Road Show in 1948. This is the time and the place to bring yourself up to date on all these new developments.

Nothing is being spared to make this the greatest indoor exhibit of machinery and materials ever gathered together. You will also hear outstanding authorities discuss solutions for the problems that are bothering you.

HOTEL SPACE WILL BE TIGHT. Write for data on reservations now. And ask to be put on the list to receive future information on the 1957 Road Show. Write to the American Roadbuilders Association, World Center Building, Washington 6, D. C. Do it now to be sure of your reservations.

This message contributed in the interests of better highways for future progress.

CONSTRUCTION DAILY
ENGINEERING NEWS-RECORD
CONSTRUCTION METHODS AND EQUIPMENT
INGENIERIA INTERNACIONAL CONSTRUCCION

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Nylon cord tires reduced off-the-road tire failures...

NOW NYLON CUTS TRUCK TIRE COSTS, TOO

VIC ZEMAN
Vic Zeman Construction
Maribel, Wisconsin, reports:

"Nylon cord is the best improvement in tires since I came into the road contracting business twenty years ago. I wouldn't be without nylon cord tires for my trucks and off-the-road equipment. They last half again as long as other kinds. They stand up much better under the strain of heavy loads, steep grades, and rough road surfaces.

"With savings on tire replacements and delays, and with the extra recaps possible with nylon cord tires, I figure my long-run savings at 50% of standard tire costs."

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

DU PONT NYLON for TIRE CORD

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . .
FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE

Here are important facts for the "man behind the gun"

This White 18" Dumpy level has ...more of the features you want, yet costs you less!

Before you buy, compare this White Dumpy level with a similar model of any other recognized make. From every standpoint — design detail . . . quality construction . . . work-speeding, life-lengthening features and cost — you'll quickly see why a White's the best buy you can make. It will make your work faster, easier, more accurate. Check this comparison chart:

FEATURES	D. White No. 7080	Instrument A	Instrument B
Magnifying power of telescope	35X	30X	27X
Distance away you can read 1/100 ft. graduation	1200 ft.	1050 ft.	900 ft.
Diameter of objective lens	1.81 in.	1.485 in.	1.69 in.
Field of view (in minutes of arc)	64'	52'	60'
Coated optics	YES	YES	YES
Covered leveling screws	YES	YES	YES
Can you easily replace worn leveling screws in the field?	YES	NO	YES
Sensitivity of level vial (in seconds of arc per 2mm of graduation)	20"	20"	25"
Price — complete with carrying case, tripod and accessories — F.O.B. factory	[illegible]	higher	higher

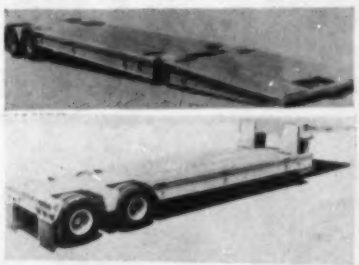
For complete details on the 18-in. Dumpy level and other equally fine engineering instruments, see your David White dealer, or write direct to David White Co., 511 W. Court Street, Milwaukee 12, Wisconsin.

DAVID WHITE COMPANY

We offer complete, expert repair service on all makes, all types of instruments.

*Price subject to change without notice.

EQUIPMENT NEWS . . . Continued

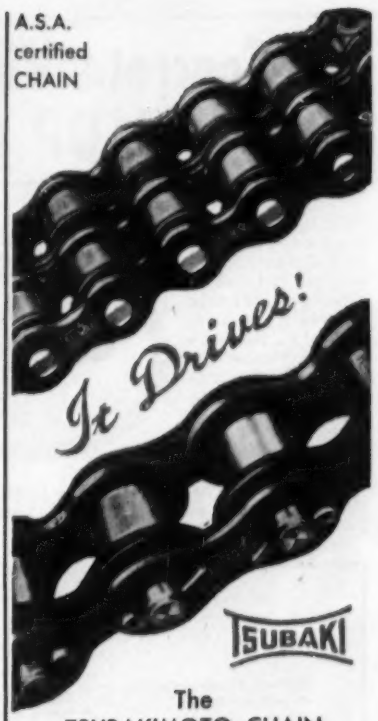


FOLDING GOOSENECK — A front and rear loading trailer features a gooseneck that folds out of the way to form a level deck. The level deck feature permits more usable platform area and shorter over-all length, and reduces the weight by approximately 800 lb as compared to Martin's drop deck trailer. Called the model RFTL, it is available in four sizes with capacities of 20, 27, 32, and 40 tons. With the folding gooseneck lowered, equipment can be driven directly on to the platform. No ramps or blocking is needed. A winch-equipped tractor then can lift the gooseneck into towing position. One man can handle the operation in 5 min, according to the manufacturer. — **Martin Machine Co., Kewanee, Ill.**

REUSABLE FITTINGS—Detachable fittings are now available for industrial Teflon hose. The fittings are leakproof even after the hose has aged; they can be assembled easily with simple hand tools; and they can be reused many times. Teflon, a new substance technically known as tetrafluoroethylene, is practically inert to most chemical action. It is ideal for steam lines, hot asphalt lines, and other installations with fluid temperatures in the –100 deg F to the 500 deg F. zone. — **Aeroquip Corp., Jackson, Mich.**

LIFE SAVER—A portable resuscitator can often avert death when a man has been stricken with a heart attack, overcome by suffocation, or exposed to carbon monoxide poison, near-drowning or electric shock. Called the Handy resuscitator, this unit is easy to operate and light enough to be carried by one man. It comes in a suitcase-like carrier made of aluminum alloy that protects it from moisture and grease. As a resuscitator, it automatically adjusts to the lung capacity of the patient, and as an aspirator it furnishes sufficient suction to clear water or mucus

A.S.A. certified CHAIN



The TSUBAKIMOTO CHAIN Mfg. Co., Ltd.
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OSAKA, JAPAN
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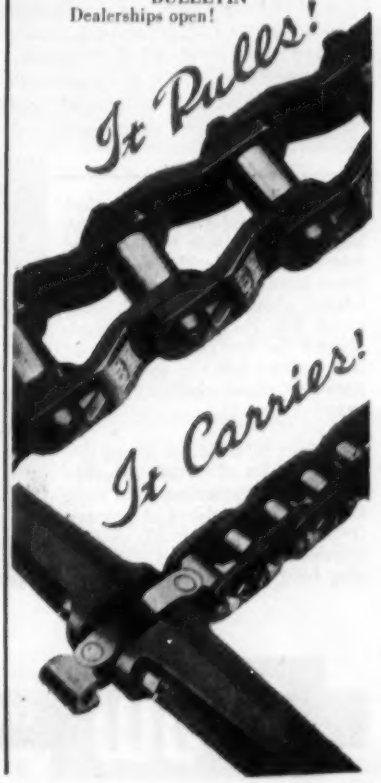
All inquiries receive prompt and careful attention.
WRITE FOR ILLUSTRATED BULLETIN
Dealerships open!



In Concrete Vibrators, it's the WALLOP that counts!

"Wallop", which is what many contractors call amplitude, is what it takes to vibrate a stiff mix —quickly and thoroughly. Recent tests prove that the efficiency of vibration increases in proportion to the amplitude. Therefore, Stow Manufacturing Co., Binghamton, N. Y., has developed a lightweight, rugged electric vibrator that packs a terrific wallop.

This wallop is achieved by the unique vibrator head, shown below, driven by a powerful 2 HP motor which delivers 9000 vibrations per minute to the mix.

Metal tip
High speed shaft seal retains oil lubricant for life
Duplex ball bearings on which eccentric weight is mounted
Nylock

Take a look at this vibrator head. It is 10 inches long, and available in diameters of 1⅝, 2 and 2½ inches, capable of 9000 VPM. Vibrations are achieved by use of an eccentric weight mounted in special high speed duplex ball bearings at each end. The outside of the head is case hardened, for extra long wear, and it has a replaceable tool steel tip. Stow estimates that these two improvements alone will double the life of the heads.

Construction men report that they like the light weight, the long life, the low replacement cost and the terrific wallop of these heads. Weight of the 1⅝" head is about 5 lbs.; the 2" head, about 7½ lbs.; the 2½" head, about 9 lbs. The cost of this head is less than 1/3 the cost of expensive motor-built-in type heads.

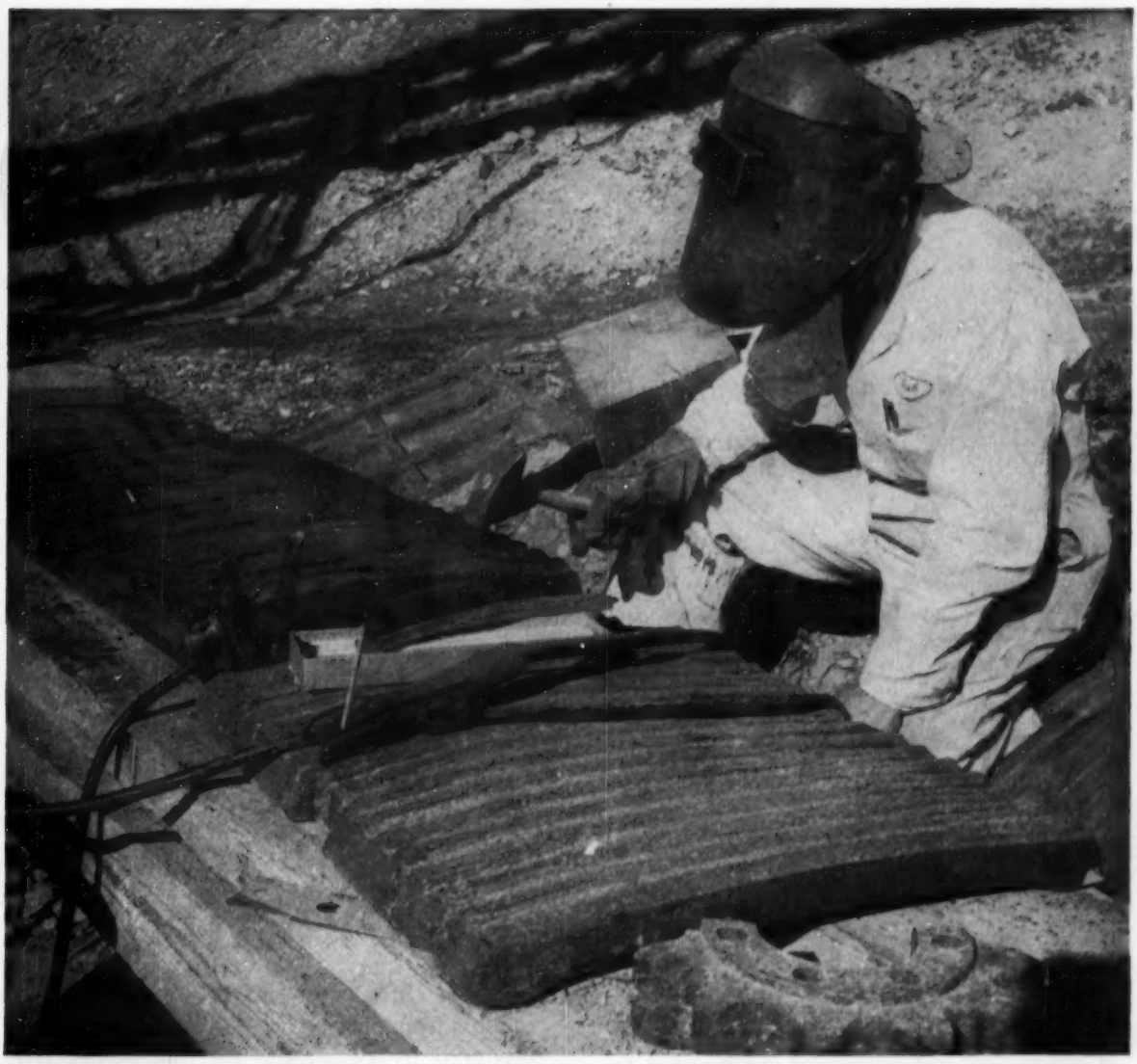
For more information about the complete line of STOW concrete electric and gasoline vibrators, vibrating screeds and rotary trowels, contact your STOW distributor, or write for STOW catalog 560!

STOW MANUFACTURING CO.
31 SHEAR STREET, BINGHAMTON, N. Y.

from the throat. The compact breathing mechanism — small enough to fit into the palm of the hand—can be used 200 ft from the oxygen supply. This makes it practical on construction jobs, where accidents might happen in out-of-the way places.—**National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.**

AIR-POWERED CHAIN BLOCK—Atlas Copco Eastern's new 55-lb air-powered chain block can lift nearly 20 times its own weight. Called the MT-504, the hoist has a maximum lifting speed of 36 ft per min. It operates from a ½-in. air line at a pressure of 85 psi, and draws 1.6 cu ft of air per ft of lift. Two leads, one for raising and one for lowering the hoist, allow the operator to control the chain block while standing a safe distance from the load.—**Atlas Copco Eastern, Inc., Paterson, N. J.**

(Continued on page 239)



Another Way to HARD-FACE CRUSHER JAWS WITHOUT DISTORTION

A good many operators of crushing equipment consider the hard-facing of jaws a mighty ticklish job; the bugaboo being distortion resulting from welding heat. But H. D. Sutcliffe, maintenance weldor at Buell-flat Rock Company in Solvang, California, has a good answer to this problem. Perhaps his method will be applicable to your operations.

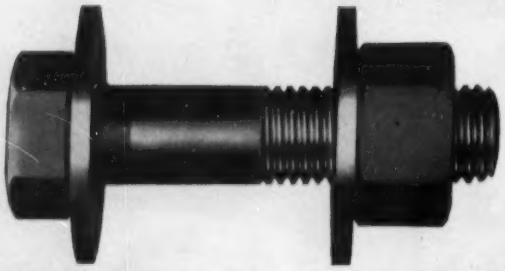
Mr. Sutcliffe has a large rack on which he places a number of spare crusher jaws or segments side by side. During the course of the day skip welds are applied from jaw to jaw as time allows, using Stoody Moly-Manganese for rebuilding and Coated Tube Stoodite for the final passes. In this way welding heat is never permitted to build up sufficiently to cause warpage. The Moly-Manganese deposits are peened and wire brushed as they are laid down. By the time the jaws on the rack are finally rebuilt and hard-faced, it is time to remove the worn jaws from the crusher, setting them up for the same rebuilding treatment.

Wear on the crusher is checked at frequent intervals and plates are removed for rebuilding before serious wear occurs. With this procedure it is rarely necessary to buy replacements. The company's experience is that Stoody Moly-Manganese and Coated Tube Stoodite are regularly giving 2 to 3 times the wear of other materials previously used.

Your Stoody dealer (consult the yellow pages of your telephone directory) will be glad to give you descriptive literature on all Stoody alloys, and a copy of the Stoody Guidebook covering maintenance of all types of heavy equipment. Or you may write to the company.

STOODY COMPANY
11972 East Slauson Avenue
Whittier, California

THREADED RODS. Two types, cut threads and rolled threads. Cut-thread rods are furnished plain or upset, in thread diameters up to and including 4½ in. Rods with rolled threads are produced in thread diameters up to and including 1½ in. Each type of rod can be supplied in a wide range of lengths, and with black asphaltum coating, if desired.



Fasteners

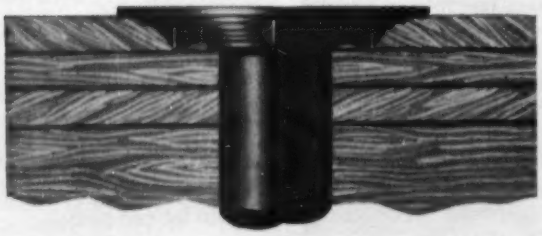
THAT GRIP FIRMLY ...AND HOLD ON

HIGH-STRENGTH BOLT. Saves erection time, as bolt can be installed cold by means of a holding wrench and pneumatic impact wrench. Bolt is made of carbon steel, and is quenched and tempered to meet requirements of ASTM Specification A-325. Used as shown, with two hardened washers. Also ideal for bridge construction, as it provides connection so tight that it effectively resists effects of vibration. Made in diameters from ½ in. to 1¼ in. Furnished in all lengths.

Here are three types of fasteners, selected at random from among the wide range of fasteners produced by Bethlehem for the construction industry. Like all Bethlehem fasteners, they can be counted on for firm grip, and dependable performance. Whether you're looking for these items, or fasteners of some other type, you can be pretty sure that we either have the style and size you want, or can make it for you quickly. Just get in touch with the nearest Bethlehem sales office about your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

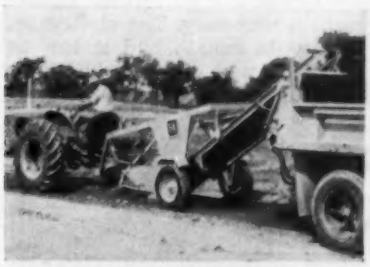
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



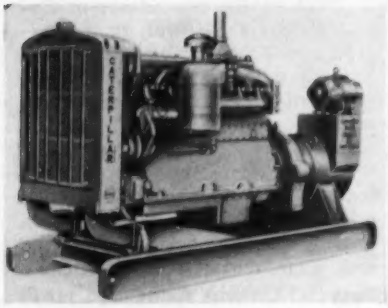
PLYWOOD BOLT. This bolt provides 50 pct more bearing surface under the head than a carriage bolt of equal size. Closely spaced spirals under the head, reversed against the threads, provide a water-tight joint, retarding dry rot. Flat head provides a flush surface which does not damage wood.

BETHLEHEM STEEL

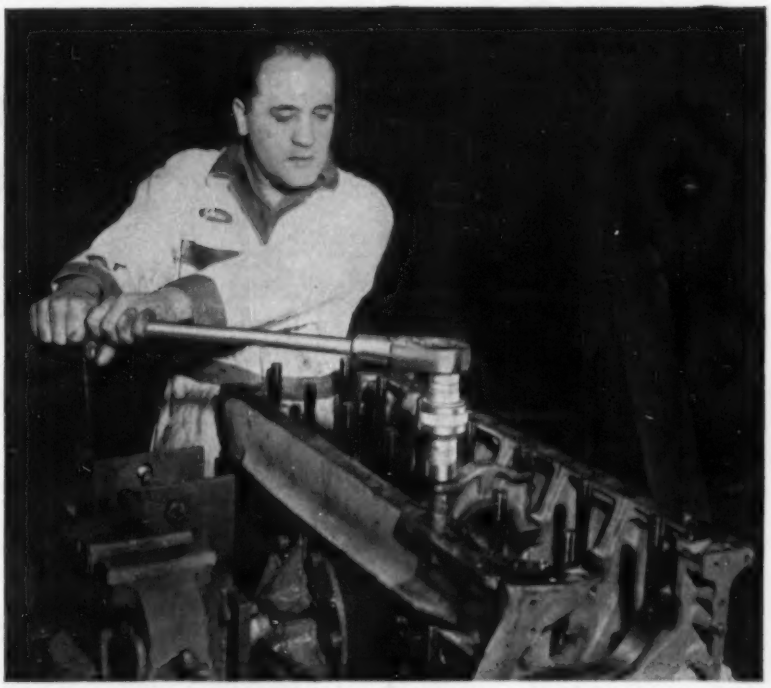
Bethlehem Bolts Are Good Bolts



PULVI-LOADER — Seaman-Andwall's Pulvi-Loader combines the rotor action of its Pulvi-Mixer with a fast, power-driven rubber conveyor belt. It is capable of digging a swath 24 in. wide and 6 in. deep and discharging it at a height of 8 ft. It digs and loads at a rate of up to 4 yd per min. The Pulvi-Loader attaches to the draw-bar, power-take-off and hydraulic system of any size tractor. It can be raised for transport or lowered to the operating position by the tractor hydraulic controls. Special wings, for loading windows up to 48 in. wide, are available. The rubber-belted conveyor is equipped with cleats. The unit, previously called the Willimon Mobil-Loader, formerly was manufactured by J. R. Prewitt & Sons. — **Seaman-Andwall, Dept. R-301, Milwaukee 1, Wis.**



SELF-REGULATED GENERATOR—A new 100-kw self-regulated diesel electric set has been added to the Caterpillar line of generating equipment. Called the Cat D342 electric set, the new unit features a compact self-regulated generator so that it combines the advantages of both self-regulated and externally regulated generators. Built to match the Cat D342 engine, it features extremely close voltage regulation so that in most cases it is capable of doing the jobs now served by externally regulated units. After the initial voltage drop and terminal voltage adjustments are made, the controls



Here a mechanic uses a Heavy Duty Loxocket Wrench with ratchet adaptor to tighten down a bearing cap on a diesel engine. In this shop, all caps are first assembled without drive shaft and bearings so that bore alignment can be tested with a special cylindrical checking bar.

*Snap-on Tools

grip safe — grip sure

A man can lean into this Extra Heavy Duty Loxocket® Wrench — and do it with confidence. It has the strength and heft to handle the big, nut-turning jobs — quickly, surely, easily.

Sockets are hot-broached providing smooth walls and corners that are free from tears and cracks. They're heat-treated all the way through for toughness on the inside as well as the outside. These, and many other developments, give *Snap-on* tools that extra measure of strength, long life and smooth fit. They'll cut your tool costs — and your downtime.

If you have a problem involving special tool design or application or any other question on tools, talk it over with your *Snap-on* man. Write us or call your nearest *Snap-on* branch. Free catalog of mechanic's hand tools is yours for the asking.

*Snap-on is the trademark of Snap-on Tools Corporation.

SNAP-ON TOOLS CORPORATION

8042-I 28th Avenue
Kenosha, Wisconsin

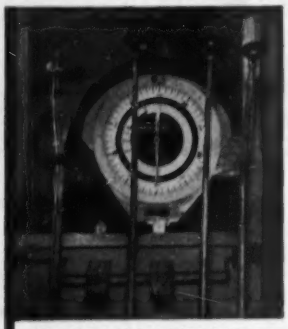
It might well be, if he lifts heavy loads by sheer guesswork — that is, without a

MARTIN-DECKER CRANE WEIGHT INDICATOR

The SB-10 Crane Weight Indicator warns your operator of an excessive load before he actually lifts it. Stops overtaxing equipment. Prevents costly accidents.

Merely by glancing at a dial a few inches from his controls, your operator instantly knows the weight, the boom radius, and the lifting capacity. He can tally weights while he's loading.

There are models for all crane capacities. For further information write Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., Dept. AC..



The Martin-Decker SB-10 Crane Weight Indicator tells you (1) the weight you are lifting, (2) the boom radius, and (3) the lifting capacity at that radius.

OTHER MARTIN-DECKER MATERIALS HANDLING INSTRUMENTS

LIFT TRUCK SCALE makes any hydraulic cylinder-type lift truck a scale, assures full, safe load.

J-701 TENSIOMETER unitized instrument, used as traction dynamometer, suspension scale, etc.

STANDARD TENSION INDICATOR used as dynamometer or for equalizing strain on cables, wires, etc.

SU-10 SENSATER hook scale. Accurate. Friction free. Rugged.

J-701 TENSIOMETER remote indicating dynamometer, suspension scale, cable strain equalizer, etc.

HEAVY-DUTY TENSION INDICATOR for use on ¾ to 1 ½" wires and cables; has 200,000-lb. capacity.

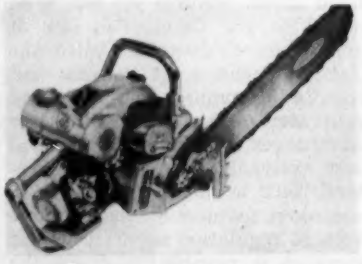
MARTIN-DECKER CORP.

HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

EQUIPMENT NEWS . . . continued

are locked and no further adjustment is necessary. The electric set is easy to install, and it can be paralleled with other generators.— **Caterpillar Tractor Co., Peoria, Ill.**

POWER TROWEL — Superior's new medium size four-blade cement finishing machine has a crank adjustment that switches the blade pitch while the unit is in operation. Called the Superior Junior, the new trowel weighs only 134 lb. Built along the same lines as Superior's bigger trowel, it is powered by a 2.5 hp Briggs & Stratton gasoline engine and it has a blade sweep dia of 33 in. The crank adjustment on the handle tilts the blades 30 deg. when the machine is being used for polishing. Other features include a sealed and lubricated gear box, Timken main bearings, stationary guard ring, and a mercury safety switch.— **Superior Cement Tool Corp., 11616 Wright Rd., Lynwood, Cal.**



CHAIN SAWS — Greater engine power and faster chain speeds have increased the efficiency of the new line of Lombard Chain Lightening

He'll live a lot longer ... and cost you much less!

SMITH

integral®

ONE FRAME FOR BOTH TRUCK AND MIXER — ONE ENGINE FOR BOTH

® TRADEMARK REGISTERED

This is a Smith INTEGRAL with front end power takeoff — one engine and one frame for both truck *and* mixer.

The photo has been cut away to show the drive shaft arrangement on the chain drive Integral.

Engine speed is reduced at the transfer case *before* the power goes into the shafts.

This means a slower shaft speed, which cuts wear tremendously on universal joints and bearings.

result? *Exceptionally long life, and astonishingly low maintenance cost.*

other features of the SMITH INTEGRAL

- Shorter center of gravity for better weight distribution.
- Lower height.
- Choice of integral mount, or with separate frame.
- Choice of chain or gear drive.
- Choice of sizes: 4½, 5½, and 6½ cubic yards (all with front end PTO).

For more information, contact your nearest Smith distributor, or write to the company.

THE T. L. SMITH COMPANY, Milwaukee 45, Wisconsin; Lufkin, Texas

Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers

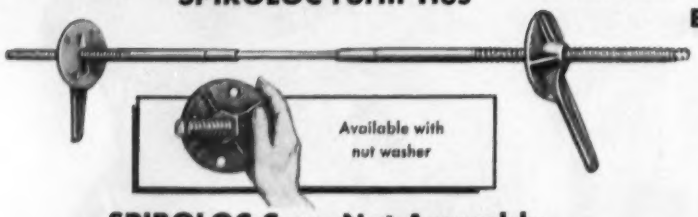
Affiliated with Essick Manufacturing Company, Los Angeles, Calif.

UNIVERSAL FORM TIES

a Complete Line From 1 Source

SPIROLOC Form Ties

Faster Erection . . . Positive Holding . . . Easier Stripping



- Greater tie strength for heavy construction
- Fewer ties per sq. ft. of form area. LOWER MATERIAL and LABOR COSTS
- Positive breakbacks
- Permanent, reuseable equipment
- RENTED . . . SOLD

SPIROLOC Cone Nut Assembly

The most positive internal spreader and form tie

TWISTYES | SNAP TIES

Positive Spreader Ties for all types of Concrete Construction

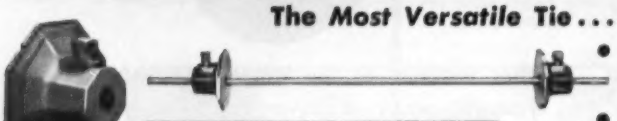
Combination wedge and bearing plate . . . easy application . . . won't twist or fall off —ample take-up.

- Low cost ties for job-built or prefabricated forms
- Used with or without walers
- Accurate breakback . . . minimum plug required
- Choice of Spreader Washer . . . 7/8" flat is standard
- Rugged Twistye and Snap Tie Clamps have extra bearing surface . . . additional safety factor

Curved ends speed installation and stripping . . . long slope wedge for ample take-up. Extra nail holes permit nailing clamp in any position.

FORM CLAMPS

The *Most Versatile* Tie . . . At the Lowest Cost



"Sure-Grip" principle means positive locking SAFE . . . SURE Tieing

- 2 Form clamps and a mild steel rod make a tie to handle any condition
- Wide clamp base gives more bearing on waler . . . won't "bite" at maximum loads
- Notched base permits nailing to waler

UNIVERSAL FORM CLAMP CO.

GENERAL OFFICES AND FACTORY. 1238 N. KOSTNER • CHICAGO 51, ILLINOIS

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Service Wherever You Build . . . Coast to Coast

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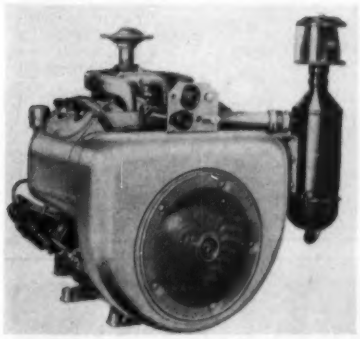
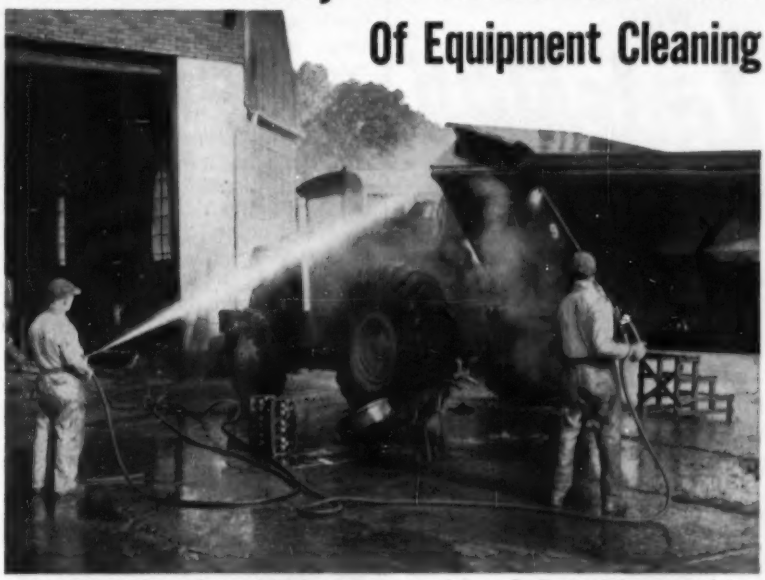
chain saws. Four models each in 16, 20, and 24-in. sizes, are available. The model 44, lowest priced in the line, has a float-type carburetor that allows it to cut in any position except straight up or down. The model 46 features a pistol grip, and a carburetor that allows it to cut at any angle. The DD direct drive saw comes with either the float or diaphragm carburetor. A new automatic oiling system adjusts to every set of conditions including type of work, speed of the saw, and the cutting temperature. The model 4D has a new spade-grip handle and a diaphragm carburetor that allows it to cut in any position.—**Lombard Co., Ashland, Mass.**



AIR COOLED ENGINE — Latest Wisconsin air-cooled engine model is the VH4, a 30-hp, four-cylinder V-type engine designed for applications where the engine must be able to carry varying shock-loads without stalling. The new engine, which has a maximum speed of 2,800 rpm, can be adapted to operate on kerosene, natural gas, LP fuels, or fuel oil with at least a 35 octane rating. Special equipment available for this engine includes a hydraulic pump, visual-type air pre-cleaner, rotating screen, electric generator and starter, clutch assembly, and reduction assembly. It can be supplied with a side-mounted fuel tank or as a completely housed power unit with a built-in or underslung fuel tank. **—Wisconsin Motor Corp., Milwaukee, Wis.**

WIDE BLADES—Clipper has introduced two new blades, the C-5419 which produces a ⅜-in. wide cut in green concrete and the C-5424 which makes a 7/16-in. wide cut. The new blades, called Green-Con abrasive blades, are designed primarily to saw control

Two-Gun Malsbary 300 Makes Short Work Of Equipment Cleaning



Hard-hitting hot solution (right) cuts grease and dirt off "Euc" while man at left cold-rinses cab. Note effective, jet-like streams—no billowing, no work-hiding fog. For indoor-outdoor use, Savin locates Malsbary 300 just inside shop.

To keep 222 pieces of heavy equipment rolling, Savin Construction Company, East Hartford, Conn., works a tight maintenance schedule. Its fast timetable depends on a two-gun Malsbary 300 HPC (high pressure combination) cleaner. This lets two men work hot solution and cold rinse simultaneously to clean and degrease on-the-double. Says Supt. Ira Davidson:

"With this enormous investment to protect, our Malsbary has paid for itself many times over. In winter, equipment is covered with ice, frozen mud, hard grease and grime – pretty tough to get off but the 300 does a dandy job . . . enables us to set up a schedule with little downtime."

4 Years without Trouble

"We use our Malsbary 300 from 7 a.m. 'til 5 or 6 at night . . . bought it 4 years ago and have had no maintenance trouble at all with it. It requires no attention other than starting and stopping and setting up the hot solution mix. Also, it's nice to know replacement parts, if needed, can be procured immediately." (Malsbary has over 175 Authorized Service Centers conveniently located.)

Only Malsbary 300 and 500 Series cleaners deliver high pressure hot solution and high pressure cold water rinse simultaneously for heavy work loads.

Keep your equipment on the job

Why let cleaning slowdowns balloon your in-shop time? The right size cleaner for your work load is the cheapest cleaner for you to buy. Ask your Malsbary dealer which model will do the most efficient, economical job for you. Have him demonstrate it on your job NOW, or write today for free catalog.

Brown County, Wis., Highway Dept. cleans tractor treads, other equipment, with mobile Malsbary 250 HPC.

91 MALSBARY SINCE 1921 MANUFACTURING CO.

Room C9, 845 92nd Avenue, Oakland 3, Calif.

MAINTENANCE IS SPEEDED IN YOUR SHOP WITH

Lodestar®

ENTIRELY NEW differently NEW

CAPACITIES: from ⅛ to 1 ton. Plugs into lighting circuit. ½ ton model weighs only 51 pounds.

$149.50 and up

...THE FIRST TRULY "HEAVY DUTY" VERSION OF THE SMALL ELECTRIC HOIST

Featuring:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Fully Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CM HOISTS AND CHAIN

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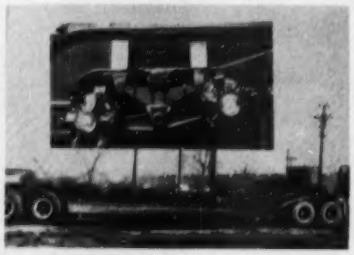
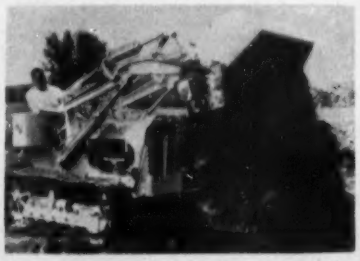
EQUIPMENT NEWS... continued

joints when corrugated cardboard strips are to be used to control random cracking in highway and airstrip construction. The wider Green-Con blades can saw out the full width of the corrugated cardboard, so that any curvature in the cardboard joints is straightened out. The new blades can be used wet or dry but for best footages it is recommended that they be used wet.—**Clipper Mfg. Co., 2800 Warwick, Suite 631, Kansas City, Mo.**



BIG MOVER—Talbert's new 90-ton capacity model TDW-90-RG low-bed trailer features a rear axle assembly with full width, solid bar axles and massive Hendrickson T-900 tandem units rated at 90,000-lb capacity. Like other Talbert movers, it has a patented removable gooseneck and removable rear axle assembly to permit loading over either the front or rear end. Standard specifications call for a deck length of 24 ft, but other lengths are available on special order. The trailer is available with either drop-side, standard platform or beam-type decks. The drop-side type deck, illustrated, is designed to reduce deck height. Over-all length is 45¾ ft and over-all width is 10¼ ft. Tires are 14.00x24, 24 ply.—**Talbert Trailers, Inc., 7950 W. 47th St., Lyons, Ill.**



REDESIGNED LOADERS—Terra-Trac crawler tractor-loaders have been re-designed so that they discharge more rapidly and completely. One new feature is a mechanical "knockout" action that jars muck out of the bucket in-

Positive AUTOMATIC LUBRICATION for AIR and STEAM TOOLS with MURRAY SIGHT FEED LINE LUBRICATOR

For less than the cost of an overhaul job on one air tool you can have positive automatic lubrication with the Murray Sight Feed Line Lubricator. Maintenance costs are reduced and the efficiency of your tools can be increased by as much as 30%.

This ruggedly built unit is mounted at the compressor tank or in the steam line and is adjustable to feed the proper amount of lubrication for the largest hammer to the smallest air spade.

The Murray Lubricator is pressure operated and feeds oil into the air or steam line in an atomized spray only when tools are operating. With no moving parts it cannot jam, clog, or flood. IN COLD WEATHER, IT MAY BE USED WITH ALCOHOL OR OTHER ANTI-FREEZE TO ELIMINATE ICING OF TOOLS. Prices range from $45 to $85. Fully guaranteed. Write today for complete information and circular.

Correspondence Invited from distributors.

MURRAY EQUIPMENT CO.
Sales Office Dept. M. Box 226
Oak Park, Illinois.
Factory—Freeport, Illinois

INDIAN
DRINKING WATER & SUPPLY TANK NO. 75G

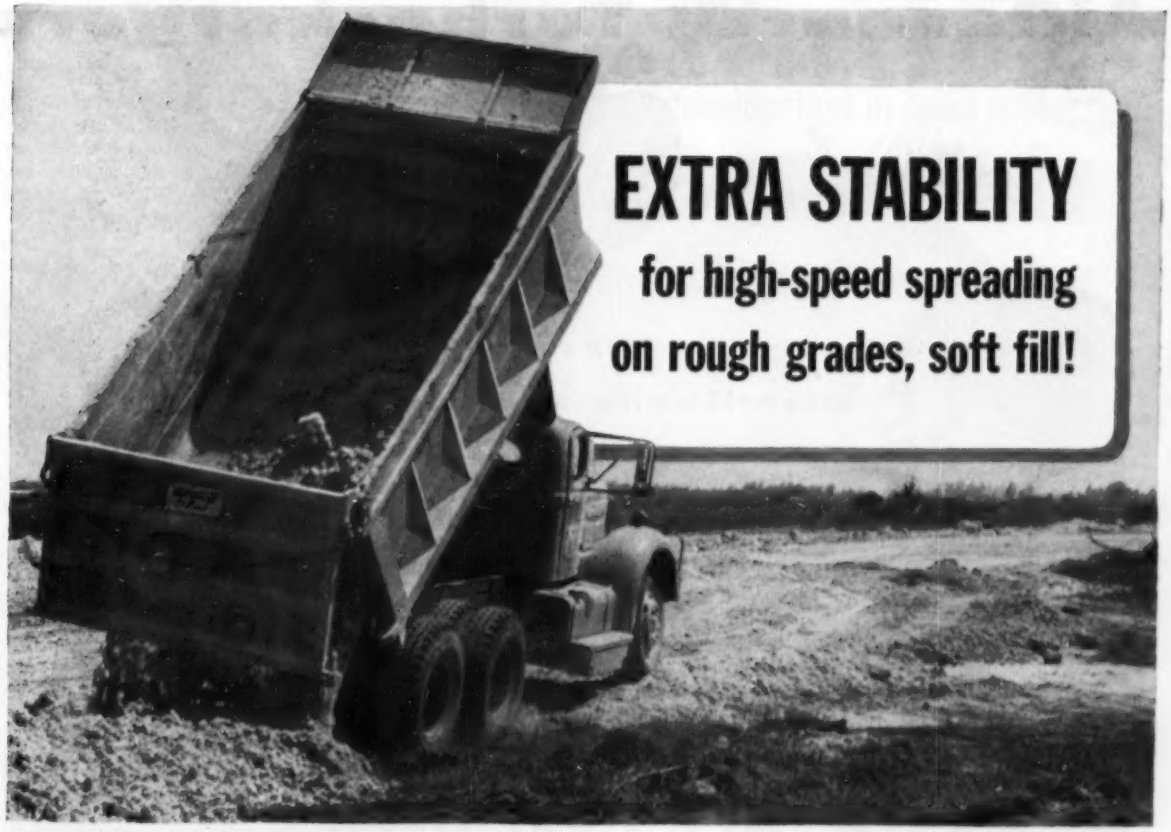
Replaces unsanitary bucket and dipper. Portable. Push button faucet. Takes cold, clean water to workers right on the job. 5 gal. steel tank is curved to fit the back. Sturdy construction. Highly popular. *Send for circular.*

SMITH
Compressed Air
No. 22GO BANNER SPRAYER
Capacity 4 Gals.

For spraying Silicon water repellants for masonry work and many other spraying purposes. Finest compressed air sprayer built. *Send for catalog on complete line.*

Discounts in Quantity Lots

D. B. SMITH & COMPANY
"Choice for Quality the World Over"
450 Main St., Utica 2, New York



EXTRA STABILITY

for high-speed spreading on rough grades, soft fill!

Andy's Trucking Service, Miami, Florida, uses GC-2 dump bodies and A-260 Strong Arm hoists to speed work on 2000-home subdivision in Hialeah. Contractor has 3-mile haul from quarry to project; spreads 17-ton loads of limestone fill at high speeds.

Strong Arm design ends one-sided dumping strain

Gar Wood-St. Paul hoists are noted for extra stability when dumping unevenly loaded bodies on rough grades and soft fill. Exclusive Strong Arm design makes the difference! A massive torque tube converts the thrust of twin cylinders to equal lifting power on both sides of dump body, regardless of load distribution or dumping angle. As a result, there's no one-sided dumping strain . . . hoist, body and truck frame last longer, operate more smoothly.

Rugged Gar Wood-St. Paul dump bodies are built to stand up under the pace and punishment of today's tight construction schedules, too. They're stress-tested to put strength where it's needed, eliminating excess weight. Matched with Strong Arm hoists, they'll deliver the payloads you need, *when* you need them and at a lower net cost per payload hour.

Your Gar Wood-St. Paul truck equipment distributor can give you all the reasons why this advanced line is preferred by contractors who bid the big ones. Give him a call, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

GAR WOOD INDUSTRIES, INC.

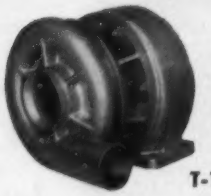
Wayne, Michigan • Richmond, California

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

GarWood -St.Paul-

Gar Wood Excavators | Gar Wood Winches | Gar Wood Tractor Equipment | Gar Wood-Buckeye Dittoers

AiResearch Turbochargers

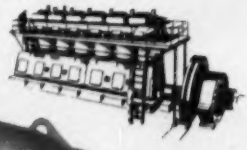


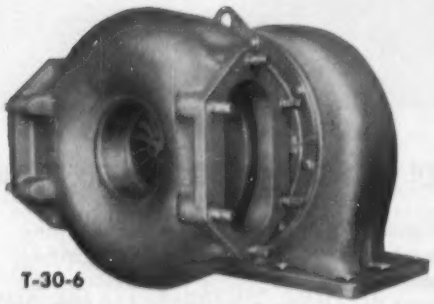
T-10

T-14

These scientifically-engineered turbochargers for your mobile, stationary or marine diesel engines are available now!

T-15





T-30-6

T-30-2

AiResearch has incorporated into the design and manufacture of its turbochargers the greatest experience in the field of small turbomachinery of any company in the world! With these results:

AiResearch turbochargers increase power up to 100%. The only limitation is the design and application of your engine.

Because they *are* air-cooled, they place no extra burden on your cooling system.

They cut fuel costs up to 20%, reduce noise and decrease or completely eliminate diesel smoking.

They're easier to maintain than any other turbochargers. A removable rotating assembly simplifies and reduces maintenance.

They allow your diesels to operate at full efficiency from sea level to more than 8000 feet.

We invite your inquiry on how you can improve the performance of your diesels by the application of AiResearch turbochargers.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	T-10	T-14	T-15	T-30-2	T-30-6
Diameter — in. nom.	9	11.5	15.25	15.25	16
Length — in.	9	14.12	16.75	17.25	21.75
Weight — lb.	40	95	125	135	195
Output — lb/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175

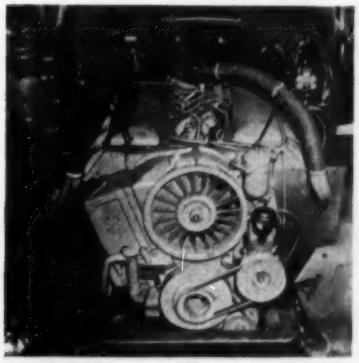
THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

stantly at all dumping heights from two ft up to full lift. This forced-ejection has been achieved by using extra-large tilt-cylinders and by revamping the dumping mechanism so that the tilt arms strike the ends of the lift arms as the bucket swings into the fully dumped position. Another feature is increased bucket dumping angles. At low heights, buckets now roll over a full 90 deg, while at maximum lift, the dumping angle has been changed to 45 deg to gain more reach for dumping into high truck boxes. Since the tilt arms now are reversible, it is possible to increase the dumping angle to 60-deg maximum lift for some jobs. Buckets can now be rolled forward as much as 110 deg at ground level. These features are included on all Terra-Trac loaders from the ½-yd model 200 to the 1-yd 600 model.—**American Tractor Co., Churubusco, Ind.**



AIR COOLED DIESELS — Deutz V-8 air-cooled diesel engines are now available on 32,000 through 40,000, four and six-wheel-drive FWD trucks. The 170-net-hp engine has an axial flow blower that takes the place of the radiator and eliminates the need for a liquid engine coolant. Made in Germany by Klockner-Humboldt-Deutz Mfg. Co., the engine has a 4.33-in. bore, 5.51-in. stroke, 640-in. piston displacement, and a maximum torque of 448 lb ft at 1,200 rpm. Heat is carried away by the cooling air packed into the V-shaped space between the cylinder rows. The axial blower is driven by gears from the camshaft drive and the amount of air needed is regulated automatically by the increasing revoiutions of the crankshaft. According to FWD, the engine's mileage characteristics, low oil consumption rate, and ease of maintenance made it ideally suited

LOOK TO WILLSON
for another new development in head protection!

NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS

FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

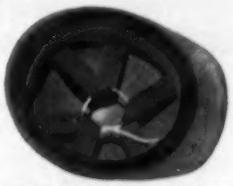
Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

Strongest Made!

See how it's built up from 24 individual die cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!

LACE-IN SUSPENSION

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



SNAP-IN SUSPENSION

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. *Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!*

Over 300 safety products carry this world-famous trademark

WILLSON
PRODUCTS DIVISION
RAY-O-VAC COMPANY
141 Thorn Street, Reading, Pennsylvania

Omark HAMMER DRIVE

"NAILS" TO CONCRETE IN SECONDS WITH A HAMMER

No Drills • No Cartridges

Omark HAMMER DRIVE tools set fasteners in concrete or steel with 3 or 4 hammer blows. Drives headed or threaded hardened steel drivepins up to 4 inches long (over 30 types and sizes). No expensive drilling or fastening equipment needed . . . just a hammer. Not powder actuated . . . can be used anywhere.

Use it for hundreds of light fastening jobs: furring strips, cabinets, electrical conduit, window frames, shelving, tackless carpet strips, brackets, partitions, panel boards, ductwork and many others.

Ask your Omark dealer about HAMMER DRIVE tools, the inexpensive, speedy fastening method.

HOW TO USE Omark HAMMER DRIVE

1. Select drivepin and insert into bottom of tool barrel.
2. Insert correct driving ram into top of tool.
3. Place tool on work surface and hit the ram 3 or 4 times with a hammer.

It's that simple! No complicated mechanism, no drilling, nothing extra to buy.

Attractive Dealerships Open
Write for Information

You Always Get a Snug, Sure Fastening With Omark Ballistic Pointed Drivepins

Ordinary drivepins have straight shank, round point. Cause hole enlargement and fastening has less holding power. Pin is hard to drive and tends to buckle.

Omark pins have ballistic taper. Prevents hole enlargement. Gives snug, high-pullout fastening. Easy to drive, doesn't buckle. Better fastenings result.

The Only Complete Line of Drivepins

Headed, ¼"-20, 10-24 and 8-32 threaded pins from ⅝" to 3" long (4" on request).

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Omark Industries
5001 S. E. JOHNSON CREEK BLVD. • PORTLAND 6, OREGON

for FWD's 300 and 400 series trucks.—**Four Wheel Drive Auto Co., Clintonville, Wis.**

DERRICK AND DIGGER—With the Tel-E-Lect hydraulic derrick and digger, two men can bore a hole and lift and set a pole in five min. The digger-derrick combination mounts on a frame than can be adapted to fit most popular truck styles. The derrick works in combination with either a hydraulic or mechanical digger. A double-acting hydraulic cylinder, with a built-in safety valve, raises or lowers the derrick. The digger can be attached directly to the derrick or to a winch line. When attached to the winch line, it digs up to eight ft deep holes at distances up to 20 ft from the truck. When attached to the derrick, its digging force is increased because as the derrick is lowered, the digger borrows the weight of the truck so that it can raise the front off the ground. One front-mounted and two rear-mounted derricks are available. They are furnished as complete kits with all the parts necessary to mount them on almost any truck chassis. — **Tel-E-Lect Products, Inc., 10,093 Minnetonka Blvd., Minneapolis 26, Minn.**

CONCRETE HANDLER — American's new Con-Vay-It concrete handler is a compact versatile unit that places a yd of concrete per

Hours saved in the trench
dollars saved on the contract...

. . . because Transite Ring-Tite Pressure Pipe handles easily, positions automatically

• Transite® Pressure Pipe with Ring-Tite® Coupling is so quickly and easily installed —you save hours of costly trench time . . . shave dollars off job costs!

Transite goes in faster, because the Ring-Tite Coupling speeds and simplifies joint assembly. Workmen simply smooth rubber sealing rings into grooves, lubricate the pipe end, and pull pipe and coupling together. Shoulders on the pipe itself position the ends in the joint automatically. The result is a joint with positive seal, yet remarkably flexible! And these rubber rings can't blow out.

Corrosion-resistant

You can assure city officials and engineers of peak performance, year after year. Transite Pipe, an asbestos-cement product, is strong, durable, highly resistant to corrosion.

For further information about Transite Pressure Pipe and Ring-Tite Coupling, write for Booklet TR-160A. Address Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

Johns-Manville TRANSITE PRESSURE PIPE
WITH THE RING-TITE COUPLING

More and more shovel operators are getting the point!

AMSCO® hardfacing cuts digging costs

On heavy digging jobs, power-shovel dipper teeth and dipper lips take rough punishment. Rounded off edges and teeth lead to wasted power, slower operation and smaller loads . . . resulting in increased digging costs.

Amsco has the answer to your dipper wear-problems!!

Hardfacing of teeth and dipper lips with *extra tough* Amsco hardfacing alloys can greatly increase service life, improve production operations, reduce power consumption.

For best results with Amsco Hardfacing Electrodes, the weld deposit should be not less than $\frac{3}{16}$" in thickness, applied in a thin layer of weld over the parent metal, followed by a heavier layer to the desired dimensions. This will assure an even, flat bead without porosity. See illustrations for proper positioning of hardfacing deposits on dipper teeth and lips.

For full information on proper hardfacing methods and materials, contact your Amsco Welding Distributor. Or write to American Manganese Steel Division, Welding Products, Chicago Heights, Ill.

Dipper teeth and lips showing proper weld deposits with Amsco Hardfacing and Amsco Manganese Steel build-up.

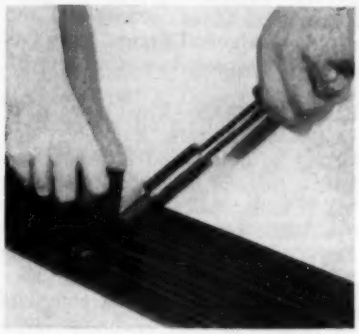
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS; JOLIETTE, QUEBEC

min when in the horizontal position. It can be equipped with an elevating device and swivel wheel assemblies to permit sidewise movement when pouring wall forms, and front and rear swivel wheel frames are available when the conveyor is carrying slab pours. Three standard lengths, 20, 30, and 40 ft, are available. At 30 deg, the 40-ft model can be elevated 20 ft. Powered by a 9-hp Wisconsin gasoline engine, the conveyor has a new snub pulley that increases belt power and prevents concrete from packing.—**American Conveyor Co., 2133-37 S. Christiana Ave., Chicago 23, Ill.**



PLASTIC JOINT—Plasti-Grip, an extruded plastic joint material can be used as an expansion joint, a construction joint or a waterstop. It comes in continuous strips 100 ft long and 5 or 6 in. wide. It can be cut with a knife and spliced on the job with a hot iron in minutes, according to the manufacturer. The extruded plastic is deeply grooved to grip concrete and it has a reinforced U-shaped center pleat that expands and contracts with the joint. Plasti-Grip is said to withstand water pressures up to 125-ft head and to stay flexible at low temperatures. It is alkali and acid resistant and easy to handle.—**Progress Unlimited, Inc., 15 W. 44th St., New York 36, N. Y.**

LOW-COST BLADE — Cardinal Engineering's new tungsten carbide diamond cutting blade for hard and soft masonry material sells for only $152. The blade, called the S-200-V, is well-suited for the contractor who wants to use a single blade to handle a variety of jobs. Available in the popular 14-in. size, the blade has most of its diamond surface concentrated along the slotted cutting edge.—**Cardinal Engineering Corp., Philadelphia 27, Pa.**

(Advertisement)

THE COMPACTNESS and lightweight portability of UniViber makes it easy for one man to handle . . . small size makes it easy to transport in trunk of ordinary car.

Extra Man Eliminated by Using UniViber Plug-in Vibrator

Motor in head design eliminates the hours wasted by workman dragging motor after the operator and provides greater flexibility in job application.

Motor in Head

UniViber power is a universal type motor connected directly to the eccentric weight it rotates. It may be plugged into any standard 115 volt AC or DC source. The motor is cooled by wet concrete surrounding the head. Speed approaches 10,000 rpm. More work can be done in less time, and with minimum danger of damage to forms by using the high speed low amplitude type of vibrator pioneered by VIBER.

Particularly adaptable for use in hard-to-reach places, UniViber may be tossed into the concrete and pulled back toward you . . . the UniViber vibrator manipulates effectively and easily by using the casing as a handle.

Greater Flexibility in Operating Techniques Reduces Costs

Wires leading to the head are protected by a flexible casing which also functions as a convenient handle. The easy-to-handle UniViber vibrator gives the workman more freedom of action because absence of moving parts in the casing allows increased flexibility. This new freedom enables the operator to employ new cost saving vibrating techniques.

Two Models Available

UniViber Model 1M3R is equipped with the Viber patented replaceable rubber tip. Model 1M3 has housing with steel nose. One piece VIBER patented eccentric weight is tapered to produce minimum vibration where brushes ride on the commutator. Another feature is splash lubricated non-metallic separator bearings, used so successfully in other VIBER vibrators.

VIBER COMPANY is a pioneer in the design and development of both internal and external vibrators. For further information on VIBER'S complete line of vibrators, contact your authorized distributor or Viber Company, Dept. 8D9, 726 So. Flower Street, Burbank, California.

VIBER

VIBRATORS SINCE 1931

CUT CONCRETE FORMING COSTS!

9 Out of 10 Shores "SLIP IN"

Ellis Methods Prove It on the Job! Minutes saved on each shore . . . inverted U-assemblies of end shores and purlins, with slip-in shore holders attached, are assembled on ground, raised, and braced. One man slips in-between shores into slip-in shore holders on purlins, no individual height adjustment needed. Ellis Methods offer tremendous savings of time, labor, and materials—no measuring, cutting, splicing, blocking, and wedging, as with old-fashioned methods. Write for details of many jobs in which more than 90% of the shores were "slip-ins."

Ellis MFG. CO., INC.

211 N.W. 4th St., Oklahoma City, Okla.

Why **STERLINGS** are **MAN'S BEST** Materials-Handling **FRIEND!**

Ask about liberal dealer sales plan

1. **ALWAYS READY** to use . . . no fuel or other "operating supplies" needed.
2. **NO "STARTING"** Problems . . . regardless of cold, heat, rain, dust.
3. **NO "HOUSING"** Problems . . . no protective warehousing needed, no covering, no "babying".
4. **NO MAINTENANCE** Problems . . . nothing to get out of order . . . rugged, long-lasting.
5. **EASIEST WHEELING** . . . with choice of pneumatic, semi-pneumatic or steel-tired wheels (with plain, ball or roller bearings.) These are the easiest rolling wheelbarrows made!
6. **EASIEST** on the barrow man . . . engineered to balance 4/5th of load on the wheel; only 1/5th of load at handle grips.
7. **EASIEST CLEANEST-DUMPING** . . . steel trays engineered to unload completely, with least effort.

Costs Less per Year

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

CONCRETE FORMING—The Uni-Form panel system of forming concrete is described in a new 32-p catalog. Well illustrated, the catalog points out the features that provide contractors with a forming method that is economical and rapid.—**Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago, Ill.**

BIG HAMMER—The new S-20 single-acting pile hammer, designed to deliver 60 blows a min with a force of 60,000 ft lb to drive the heaviest piles, is described in a bulletin just issued by McKiernan-Terry. The booklet includes operating data, dimensions, sectional elevations, and a complete parts lists, as well as maintenance and cost information—**McKiernan-Terry Corp., 100 Richards Ave., Dover, N.J.**

WIRE ROPE DATA—The manufacturers of Tiger Brand wire rope have prepared a comprehensive, 86-p catalog on the handling and care of wire rope. Besides providing information on maintenance, the catalog lists the various types and grades of rope and their recommended uses; describes the complete line of Tiger wire rope fittings; and includes a practical glossary of terms commonly used by those who work with wire rope. —**American Steel & Wire Div., United States Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.**

SAFETY SHOES—A 24x38-in. poster, designed to be displayed at central project locations, shows 67 different styles of specialized safety shoes and boots. Contractors can order a number of these posters free if your request is made on company letterhead, and display them in prominent places. Men on the job will appreciate the low prices and wide choice. They can order in groups or individually direct from the manufacturer who guarantees to deliver any style or

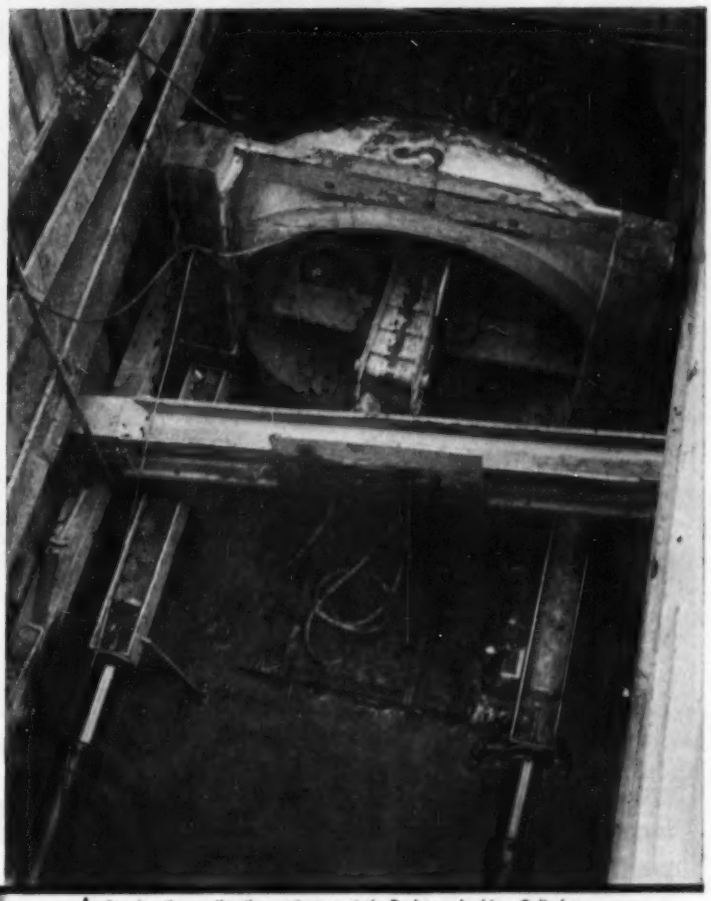
MUSCLES under the mainline!

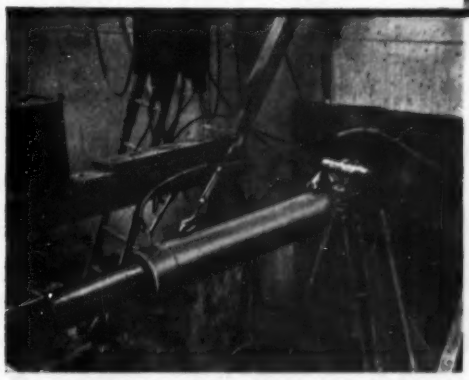
Rodgers Hydraulic Jacks

push three 88 foot tiles under railroad without disrupting traffic

Two 200 Ton Rodgers Hydraulic Jacks were selected by W. J. Irwin & Sons, Inc., Tonawanda, N. Y. for driving three sewer pipes of 96" I. D. reinforced concrete tile 88' under the mainline of the New York Central Railroad. Part of a 2½ million dollar sewer contract on the Tonawanda West Side Drainage Project, the "push pipe" method was preferred because it permitted unrestricted use of the rail right-of-way overhead.

TIME: 34 DAYS—Actual jacking time consumed 34 days based on three-eight hour shifts a day. Each sewer took eleven 8-foot tile sections. The *First Line* required 14 days; the *Second Line* 11 days and the *Third* only 9 days.





Steel rails cradle tile sections as twin Rodgers Jacking Cylinders press against the wooden jacking frame. Heavy grease on outside of tile cuts down friction—for easier sliding.

Rear of excavation pit showing Hydraulic Jack against abutment wall. At this stage the ram is extended approximately ⅓ of the 48" ram travel.

JACKING PROCEDURE—A service pit 28' deep by 22' wide by 40' long was excavated to house the jacking equipment. A pair of 75 lb. steel rails placed on the concrete pit floor cradled the tile sections and acted as a guide for the jacking operation. Type of soil encountered in all three pipes was a mixture of heavy yellow and blue clay.

EQUIPMENT USED—Two 200 Ton Rodgers Hydraulic Jacks with 48" ram travel were powered by a Rodgers Model D2 electric driven hydraulic pump located at the top of the excavation pit. A valve panel located at the bottom of the pit permitted accurate control of the jacking operation.

ADVANTAGES OF HYDRAULIC JACKING—This job was handled at low cost and was unique due to the short time required for completion and the fact that rail service overhead continued uninterrupted throughout the tunneling project below. Entirely different from conventional tunneling, the "push pipe" method also provides greater safety to workers from cave-ins since they work inside the tile that is being driven.

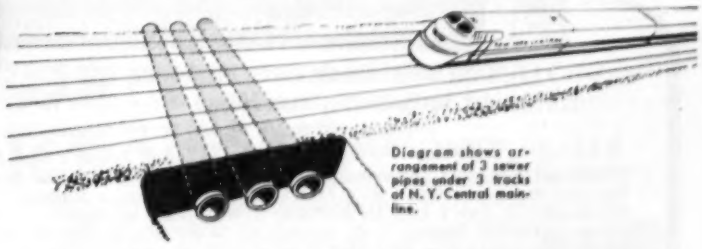


Diagram shows arrangement of 3 sewer pipes under 3 tracks of N. Y. Central mainline.

If you'd like more details about this job, write for free copy of Bulletin 331.

Rodgers Hydraulic Inc.

7403 Walker St. • Minneapolis 26, Minnesota

gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile

Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H.W. "Heine" Gentry Co., Walnut Creek, Calif.

Hauled along highway like semi-trailer • Set up in one day—no field wiring, concrete footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized . . . batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

NOBLE BATCHING PLANTS

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 - 7th St., Oakland 20, Calif. TEmplebar 2-5785

Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.
518 First Ave. North, Seattle, Wash. MUtual 4878 · 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.

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NEW PUBLICATIONS . . .
Continued

size desired from warehouse stocks. **—Lehigh Safety Shoe Co., Emmaus, Pa.**

PUMP INFORMATION—The contractors' pump bureau of the AGC is publishing a new edition of the "Contractors' Pump Manual," which has been out of print for several years. The manual is prepared by the pump manufacturing industry with the cooperation of the AGC's pump bureau to advise contractors on the characteristics and types of pumps most suitable for various construction jobs. The manual covers three basic types of pumps most often found at construction jobs — the self-priming centrifugal pump, the diaphragm pump, and the self-priming well point pump. Copies of the manual are available free from the manufacturers, or for $1.00 through the **Contractors' Pump Bureau, The Associated General Contractors of America, 1227 Munsey Building, Washington 4, D.C.**

HARD SURFACING SPECS—Specifications covering welding rods and electrodes used for hard surfacing have been issued by the American Welding Society and the American Society for Testing Materials. Forty-five classifications on filler metal have been established, covering high speed steels, austenitic manganese steels, austenitic high-chromium irons, cobalt-base filler metals, and copper-base and nickel-cromium-boron filler metals. An appendix contains data on hardness, hot hardness, impact, oxidation resistance, abrasive strength and machinability of various rods and electrodes. Copies cost $.40—**American Welding Society, 33 W. 39th St., New York 18, N. Y.**

WIRE REINFORCEMENT — The use of welded wire fabric reinforcement in asphaltic concrete pavement overlays is the subject of a technical bulletin the ARBA is now distributing. The bulletin describes in detail the resurfacing in 1955 of major portions of the Detroit Willow Run Airport, and also discusses a 1953 fabric-in-asphalt job in Washington D. C. The book also reviews the history of the fabric-in-asphalt process, recounts reasons for its growth and development, and notes several other successful installations. Cop-

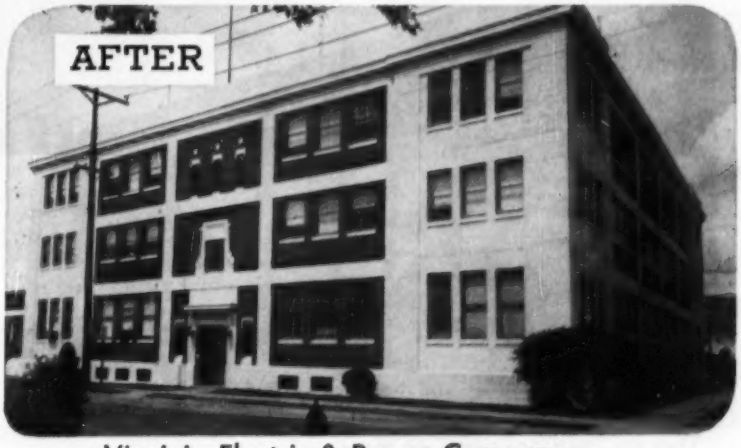
THORITE and THOROSEAL furnish office building with *That New Look* plus all-weather protection.

BEFORE

Severe weathering had deteriorated sections of cornices, sills, lintels and ledges. Cracks permitted water penetration, causing damage to interior of building.

All cracks were opened with hammer and chisel, spalled areas cut and cleaned, then patched with THORITE, followed by two brush coat applications of Pearl Gray THOROSEAL.

Brick was left uncoated to develop pleasing contrast. See Circulars No. 16 and 20.



Virginia Electric & Power Company
Richmond, Virginia

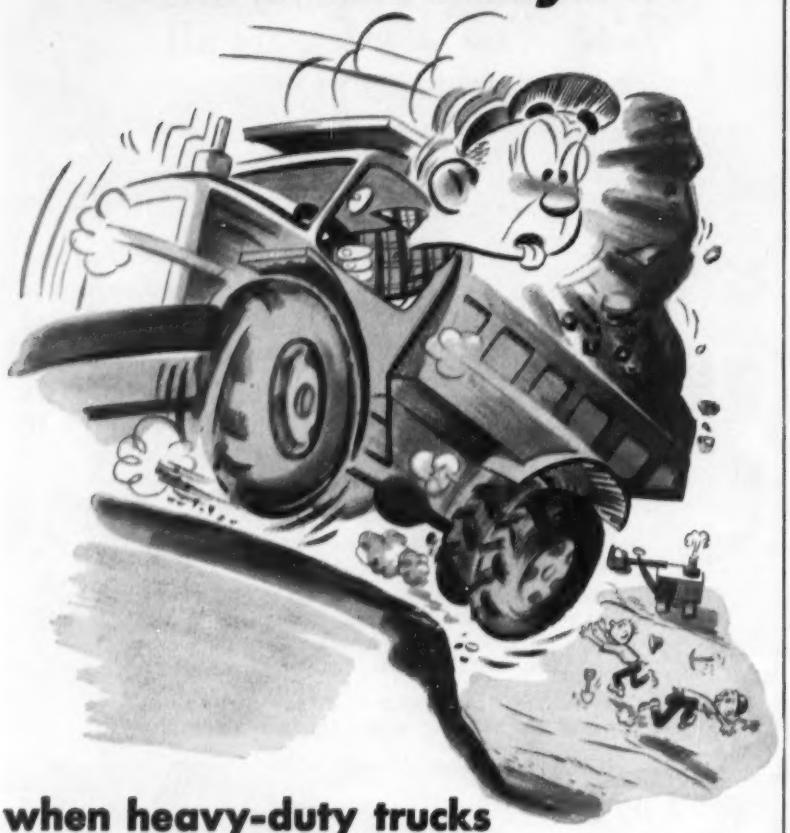
THORITE 20 minute set patching mortar — ***NONSHRINK PATCH***

THOROSEAL — ***MASONRY SEALER*** seals masonry walls against water and beautifies surface

"How to do it" GET OUR 16 PAGE BROCHURE

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA. CENTERVILLE, IND.

Drivers last longer...



when heavy-duty trucks

use J-M Brake Blocks

Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y.

Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

INDUSTRIAL FRICTION MATERIALS

NEW PUBLICATIONS . . .

continued

ies are available from the ARBA or from **Wire Reinforcement Institute, Dept. 215 National Press Building, Washington 4, D.C.**

HYDRAULIC SYSTEMS—Vickers Inc., has published a 20-p. illustrated bulletin describing oil-hydraulic systems and components for mobile equipment. The new catalog contains performance, design, and construction characteristics of Vickers single and double vane pumps, power packs, multiple unit valves, relief valves, reservoirs, fluid motors and power steering boosters.—**Vickers Inc., Box 302, Detroit 32, Mich.**

DETROIT DIESELS—A handy reference booklet lists over 1,000 models of construction and industrial equipment now available with Detroit Diesel engines as standard or optional power. Over 150 manufacturers are represented. Detroit Diesel engines are available in capacities of from 30 to 893 hp.—**Detroit Diesel Engine Div., General Motors Corp., Detroit 28, Mich.**

CONCRETE HANDLING—The Rex Railporter, a completely self-propelled hopper that delivers concrete by riding a single rail at a 300 fpm rate is described in an 8-p bulletin. The Railporter is loaded at the point of supply and sent to its destination by engaging the clutch lever. The unit follows the rail to its destination and halts automatically when it reaches a stop in the tracks. Workers discharge the material to either side and engage the clutch to return the hopper to the loading point. Many on-the-job illustrations are included in the booklet.—**Chain Belt Co., Milwaukee 1, Wis.**

BITUMINOUS MIX PLANTS—A trio of new bulletins describes Pioneer's three sizes of Continuflo bituminous mix plants. Plants covered are the model 51, with a capacity of from 40 to 60 yph; model 81, with a capacity of from 60 to 80 yph; and model 102 with production ranging up to 150 yph. The flow of material through each of the plants is illustrated by 4-p cutaway spreads, and component parts are described by word and picture to give the reader a clear understanding of the Continuflo process.—**Pioneer Engineering Works, Inc., Minneapolis, Minn.**

THE NEW PRIME-MOVER M30 WITH TORQUE CONVERTER DRIVE

Bulk-handling body shown. Capacity 18 cu. ft.

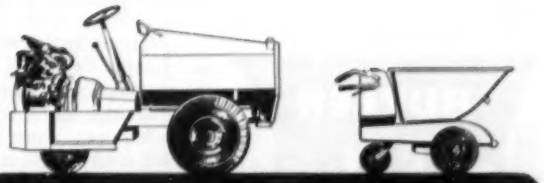
Puts greater POWER • SPEED • CAPACITY to work for you!

PROVED BY PERFORMANCE ON CONSTRUCTION

The M-30 delivers high production on your toughest handling jobs. Carries a ton-and-a-half load. Maneuvers in close quarters. Climbs steep grades. Travels fast.

Propelled by the exclusive Prime-Mover torque converter drive—no shifting—no clutching. You set the directional lever in forward or reverse—and step on the gas.

Let this husky truck with its dependable Wisconsin engine and smooth torque converter do more work for you. See nearest Prime-Mover distributor about your handling problems. The Prime-Mover Co., Muscatine, Iowa.



PRIME-MOVER

More power to you—from PRIME-MOVER

WHAT 0-1-0 MEANS TO YOU

0-1-0 is the model designation of the Butler *one-man operated,* automatic Roadbuilders Plant . . . And to you as a contractor it means such a sharp reduction in costs you can bid any paving job successfully against any competition owning "yesterday's" equipment.

The highway authorities wholeheartedly approve the BUTLER 0-1-0 for all gates are so completely interlocked they cannot discharge until correct weights are in the hopper . . . nor can the batcher be charged until the previous batch is cleared. Quality control is absolute! Human errors cannot occur and the engineer's life is easier.

Other BUTLER 0-1-0 features

- Keeps two 34E drum pavers busy.
- Master controls pre-set at each batcher for any batch proportion. Easily re-set when specification changes.
- Batches sand, cement and 2 sizes of stone simultaneously, automatically.
- One man at cement batcher operates all 3 plants with push button control.
- If desired, truck drivers can actuate sand and stone batchers with push-buttons mounted on bin columns.

For the full story of the BUTLER 0-1-0 Plant write for detailed, illustrated Bulletin. Just a postcard will bring it to you immediately. Write today — while you are thinking about it.

BUTLER BIN CO.

949 BLACKSTONE AVENUE • WAUKESHA, WISCONSIN

JOYCE JACKS

the complete line for every need!

JOYCE JOURNAL JACKS
JOYCE BALL BEARING SCREW JACKS
JOYCE SCREW JACKS
JOYCE HYDRAULIC JACKS
JOYCE AIR MOTOR JACKS WITH TOE LIFT
JOYCE AUTOMATIC LOWERING JACKS

Pick any lifting job . . . you'll find there's a Joyce Jack that will fill the bill! For Joyce builds a complete line of ratchet, screw, hydraulic, air operated jacks, trench braces and material lifting equipment . . . to meet every lifting application. And you can depend on Joyce Jacks too . . . for Joyce top-quality products have been the by-word for lifting equipment since 1873!

. . . write for complete information today!

IN CANADA: Midland Foundry & Machine Co., Ltd., Midland, Ontario

JOYCE

THE JOYCE-CRIDLAND CO.

DAYTON 3, OHIO

SOME BIG CONTRACT AWARDS OF THE MONTH

Paul Tishman Co., Inc., Construct and Finance 21 E. 70 St., New York, N.Y. Family housing, 505 units, Otis Air Force Base, Falmouth, Mass. Purchasing and Contracting office, Otis Air Force Base, Falmouth, Mass. $6,813,996.

George A. Fuller Co., 11 Beacon St., Boston, Mass. Factory in Wauregan Section east of Junction Rtes, 12 and 202, Plainfield, Conn., for American Radiator & Standard Sanitary Corp., 40 W. 40 St., New York. N.Y. $8,000,000.

C. K. Moseman, 727 Barron Ave., Redwood City, Calif. Grading, paving 1.2-mi freeway with ramps, six bridges, three pumping plants, U. S. 99 between Cherry Ave. and Princeton Ave. in Fresno for the California State Div. Hys., 1120 N St., Sacramento, Calif. $1,568,300.

Girdler Co., div. of National Cylinder Gas Co., 224 E. Broadway, Louisville, Ky. Expansion of facilities, including new boiler plant, doubling production capacity of polyvinyl resins and plastic compounds at Avon Lake, Ohio for the B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio. $8,000,000.

American Bridge Div., U.S. Steel Corp., 525 W. Wm. Penn Pl., Pittsburgh, Pa. Superstructure high-level cantilever bridge over Calumet River, Section 6-C in Chicago, Ill. City, City Hall, Chicago. $6,835,170.

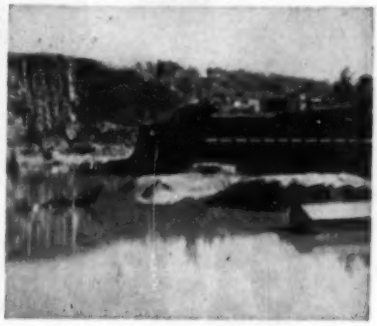
Midwestern-Johnson-Dixon (Midwestern Constructors, Inc., 105 N. Boulder St., Tulsa, Okla, Johnson Western Contractors, Box 6, San Pedro, Calif. and L. E. Dixon, 409 S. Calif. St., San Gabriel, Calif.) 38.5-mi. 34-in. steel gas pipe line near Gilroy to Milpitas, Calif., 25-mi. from Panoche Junct. to west of Kerman to Llanada, east of San Benito, Calif. and from Topock, Ariz. 21.5 westerly. Arizona and California Pacific Gas & Electric Co., 245 Market St., San Francisco 6, Calif. $10,000,000.

Utah Construction Co., 100 Bush St., San Francisco, Calif. Design and construct chemical plant in Chandler, Ariz. for Southwestern Agrochemicals Corp., 801 N. 1 Ave., Phoenix, Ariz. $5,000,000.

HOW TO HANDLE WET JOBS

REMOVE 600 MILLION GALLONS FROM FLOODED QUARRY

Alpha Portland Cement Co. plant at Martins Creek, Pa.



HIT BY HURRICANE Diane, Martins Creek leaped its banks and flooded this quarry over 100 ft deep — shown by dotted line in photo.

WATER LOWERED 87 FT—14 ft to go — as Griffin pumps perform dependably and economically in one of the largest dewatering projects ever completed.

Griffin personnel and equipment were rushed, plans set and pumping started — all in 5 days. Quick Griffin service and reliable equipment helped Alpha resume production ahead of schedule.

GRIFFIN

WELLPOINT CORP.

881 East 141st Street, New York 54, N. Y.
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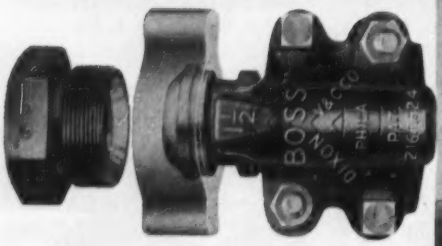
Safest Connections for Pile Driver Hose

AND OTHER STEAM, AIR, WATER AND HYDRAULIC APPLICATIONS

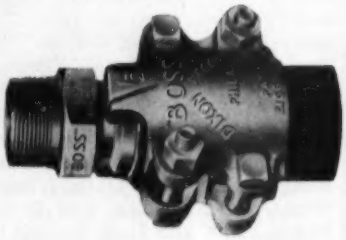


"GJ-BOSS"

GROUND-JOINT FEMALE COUPLING, STYLE X-34

The original *washerless* coupling that is unequalled for *safety* in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal . . . no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes ¼" to 6", inclusive.

COMPANION MALE COUPLING "BOSS", STYLE MX-16 . . .



Designed as the companion coupling for the "GJ-Boss" described above, and the "Boss" Washer Type Coupling Style W-16, this male fitting will prove equally efficient and economical for all applications in which standard iron pipe nipples are normally used. Each size fits same size hose . . . oversize hose is not required. Used for the same wide range of services as the "GJ-BOSS", and for high or low pressures. Coupling consists of I. P. T. male stem and "Boss" Offset and Interlocking Clamp. Steel or malleable iron, thoroughly rustproofed. Sizes ¼" to 6", inclusive.

Stocked by Manufacturers and Distributors of Mechanical Rubber Goods

DIXON *Valve & Coupling Co.*

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA. BRANCHES—CHICAGO BIRMINGHAM • LOS ANGELES • HOUSTON • DIXON VALVE & COUPLING CO., LTD., TORONTO

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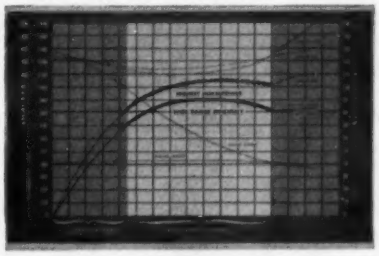
• Listen!
Look!
Talk!
Argue!
Think!
then VOTE

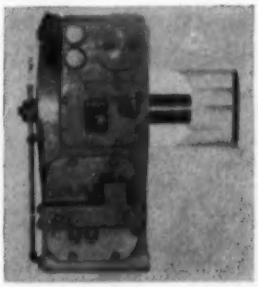
MORE WORK DONE, LESS MAINTENANCE

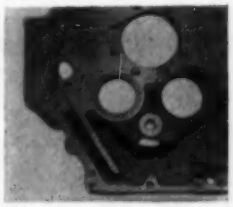
—these benefits are built in TORCON Torque Converters



* Engine efficiency and torque demand in constant balance...

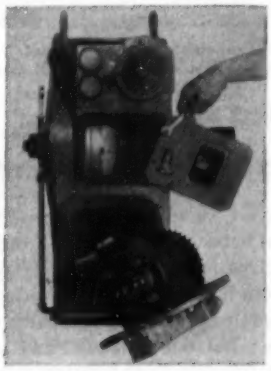
Torcon design provides that the engine will operate at its most efficient speed, with torque multiplication to meet constantly changing demands. Torcon blade design eliminates cavitation, assures high efficiency throughout a wide working range.





* Integrated oil system...

Oil sump is an integral part of the housing casting—an important advantage. Internal oil passages are cast in the housing—reducing the number of parts, eliminating unnecessary hoses and fittings, preventing leakages that impair efficiency. Oil flows automatically to lubricate all working parts.



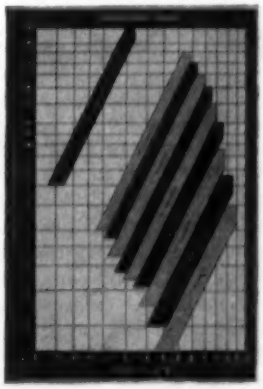
* Easy accessibility...

Ample sized cover plates are easily removable for quick inspection—no special tools required. Regulating valves are mounted on the outside of the housing, for immediate inspection.

* A complete line—15 to 600 HP

Torcon torque converters include mass-produced standard package units available to equipment manufacturers and to owners and operators for field installation.

A broad range of wheel diameters and options assures a unit that can be fitted readily into any power-transmission system.



THIS BULLETIN WILL BE HELPFUL

A brief, clear statement of Torcon features—well illustrated. Use the coupon.

CLARK EQUIPMENT COMPANY, Transmission Division
Falahee Road, Jackson 6, Michigan

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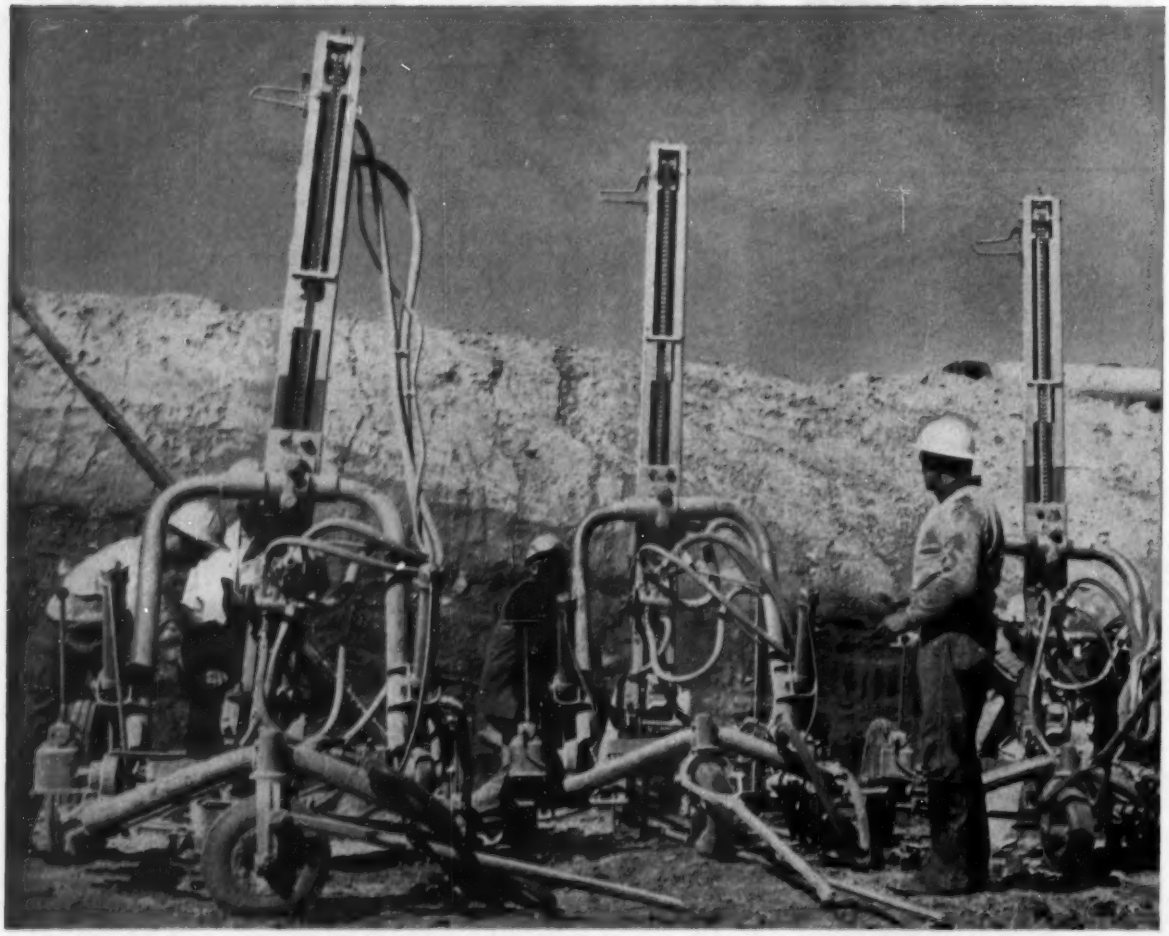
CLARK EQUIPMENT COMPANY
Jackson, Michigan



Making blast holes with Bethlehem Hollow during early stages of construction for Long Sault Dam. Contractors are Walsh Construction Co. and B. Perini & Sons; Morrison-Knudsen Co.; Peter Kiewit & Sons; Utah Construction Co.

240,000 cu yd of Dolomite Being Moved for Long Sault Dam on St. Lawrence

What you see here is Bethlehem Hollow Drill Steel making blast holes in dolomite at the site selected for Long Sault Dam, near Massena, N. Y. The dam, part of the St. Lawrence River Power Project, is to be a curved concrete gravity-control structure, 2890-ft long. Including earth wing dams, its eventual length will be 7340 ft. Its 30 ogee spillway openings will be controlled by 50 ft x 28 ft vertical lift gates, flanked by concrete overflow sections and earth embankment to high ground at each end.

Bethlehem Hollow was used almost exclusively on this job, in ⅞-in. hexagons and 1¼-in. rounds, fitted with carbide-insert bits. Because of the rock condition, blast holes were limited to 5 ft. The drill steel performed economically, with minimum breakage.

Wherever there's rock to be moved, whether for a dam or highway, or in a mine, or some other application, you can count on good, steady performance from Bethlehem Hollow. That is because it is rolled from a special grade of steel which is resistant to fatigue. Bethlehem Hollow has a uniform hole, centrally located in the bar. It also has a wide quenching range, and is easy to heat-treat for the proper balance of toughness and wear-resistance, making possible long-wearing threads and strong shanks.

Bethlehem Hollow is made in carbon and ultra-alloy grades, in rounds, hexagons and quarter-octagons, generally in lengths of from 18 ft to 25 ft. It also comes in longer lengths to meet special needs. Keep Bethlehem Hollow in mind for your next rock-removal project.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM HOLLOW DRILL STEEL CARBON *AND* ULTRA-ALLOY

BETHLEHEM STEEL

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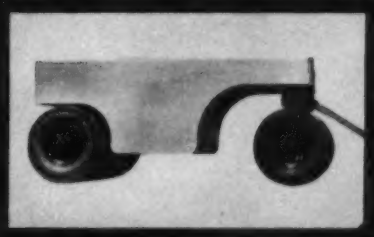
BEST IN THE LONG RUN



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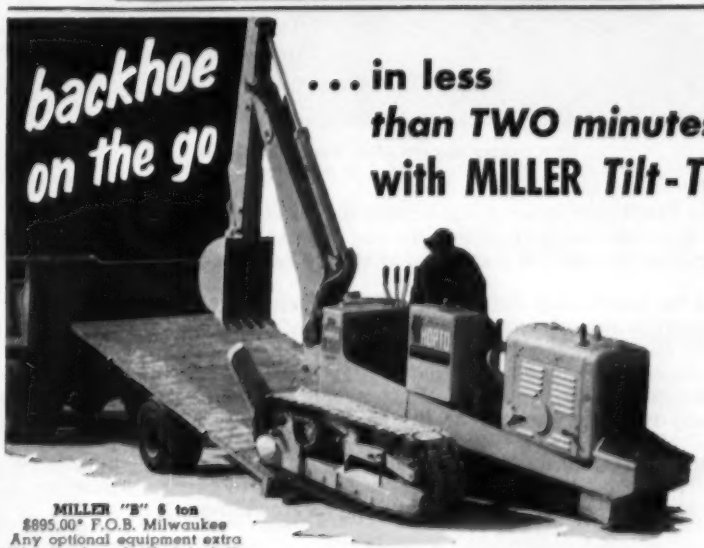
GRACE HEATERS AND COMPACTORS

Oil heaters for automatic heating of hot plants, save labor, fuel and water — also Rapid Fire circulating asphalt heaters.

W. E. GRACE MANUFACTURING CO.
6100 S. LAMAR DALLAS, TEXAS

backhoe on the go

... in less *than TWO minutes* with MILLER *Tilt-Top!*



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$895.00* F.O.B. Milwaukee
Any optional equipment extra
*Plus Freight and 4% Federal Tax

Whatever you haul . . . dozers, rollers, trenchers, front-end loaders or backhoes, you'll load them faster . . . slash between-job-hauling time with a MILLER Tilt-Top! ONE man can tilt, simply drive the equipment onto the broad, oak decked platform, be on his way in *less than two* minutes! Available in a variety of single or tandem-axle models, there's a MILLER Tilt-Top to match your equipment needs. See these time saving, production boosters at your MILLER distributor today—you'll be surprised at how ruggedly they're built—how little they cost!

✓ built best
✓ priced best

See your MILLER distributor or write for FREE literature to:

Miller Tilt-Top Trailer Co.
457 S 92nd Street, Milwaukee 14, Wis.

NO SECRET

About NAYLOR *Performance*

De-watering quarry after Hurricane Diane

The familiar Naylor spiral brings the outstanding performance of this light-weight pipe right out into the open — for water, air, ventilating and materials handling in construction service.

It's no secret that Naylor's exclusive lockseamed, spiralwelded structure means extra strength and safety. The spiral truss acts as a continuous expansion joint to absorb shock loads, stresses and strains. In addition, it provides greater collapse strength for push-pull ventilation and other applications normally requiring heavier-wall pipe.

For all-around service on construction jobs, you can depend on Naylor pipe, in diameters from 4" to 30", to get the economy of light weight without sacrifice of performance.

Write for Bulletin No. 507.

NAYLOR PIPE

NAYLOR PIPE COMPANY
1268 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

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"EQUALIZER"

In the old west, a Colt revolver was known as the "great equalizer." Today, it is your vote.

When you step into the voting booth, you enter the one place in the world where all men are truly equal. Your secret vote carries the same weight and counts exactly as much as that of the mightiest person in the U.S.A.

See you at the polls!

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Has soft arc action

Yet has equal penetration

WHY

use anything but FLEETWELD 5-P for general purpose welding

FLEETWELD 5-P

- for structural welding
- for code work in shipyards
- for pipe welding...vertical up or vertical down

gives these cost-cutting advantages:

- uniform, deep penetration
- flat shaped bead
- easy slag control to cut surface holes
- steady arc action
- X-Ray quality

Specifications and Procedures in Weldirectory SB-1351.

Write

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

One dependable source for all your welding needs

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THE LINCOLN ELECTRIC COMPANY
Dept. 2710,
Cleveland 17, Ohio

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Address_____

City_____ State_____

Name_____

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LOW COST—DEPENDABLE
INDUSTRIAL RUBBER PRODUCTS

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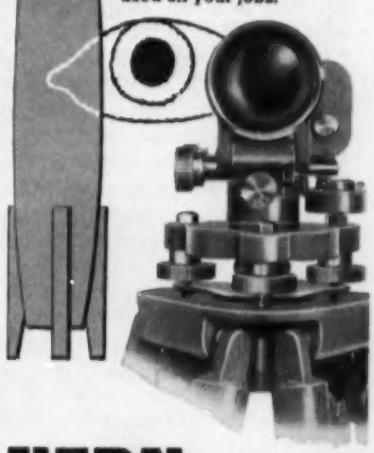

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Methods Memo . . .

Top Notch Roads

Standards for construction of the 41,000-mi Interstate Highway System under the new highway act are high.

The Bureau of Public Roads, in cooperation with the American Association of State Highway Officials, has fixed standards for the $27.5 billion road building program aimed at providing highways adequate for 1975 traffic. Main points are these:

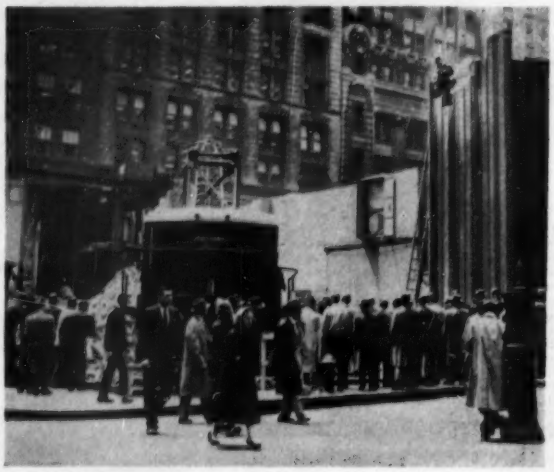
- Access will be controlled on all sections of the system except in sparsely populated rural areas of the west where intersections at grade will be permitted under certain conditions.
- Nearly all of the system will consist of divided highways with four or more traffic lanes. Two-lane highways will be permitted only in flat country where 1975 traffic is not expected to exceed 5,000 vehicles daily.
- Traffic lanes will be not less than 12 ft wide, and median strips generally will be at least 36 ft wide. In urban and mountainous areas a minimum of 16 ft will be permitted, and under unusual conditions the median strip may be reduced to not less than 4 ft. Shoulders at least 10 ft wide (6 ft in mountainous terrain) and usable by all classes of vehicles in all weather are required.
- Bridges and overpasses will be deck type preferably. All structures will allow at least 14-ft vertical clearance over roadways and shoulders. The full width of traffic lanes, median strip, and shoulders will be carried across bridges of 150-ft lengths or less and through underpasses. On longer bridges, the median width may be reduced to not less than 4 ft, and the pavement width between curbs or parapet walls will be several feet more than for approach traffic lanes.

New Directory

The American Road Builders' Association announces that the 1956 edition of its directory of highway officials and engineers is off the press.

The directory is a pocket-sized handbook that includes:

- Names, titles, and addresses of administrative engineers and officials of the 48 state highway departments and the District of Columbia.
- Administrative personnel of the Bureau of Public Roads and heads of its division offices.
- Engineers and administrative personnel of toll road authorities.
- Officers and directors of ARBA, its seven organized divisions, and its Washington staff.
- A tabulation by states of highway funds expended during 1955 and estimates of expenditures for highway construction and maintenance during 1956.
- A report on states with legislative authority to build toll roads.



Planning a Tough Job

Sidewalk superintendents in New York's financial district get their first glimpses of construction men working at the site where the Chase Manhattan Bank's spectacular $75 million main office building will go up.

Thomas Crimmins Contracting Co., the foundation subcontractor, is driving L. B. Foster steel sheet piling 75 ft below street level to bedrock for a test pit to help plan foundation work.

Constructing the foundation probably will be the most difficult part of the job. Five stories will be below ground level, and a water table at minus 3 ft will make it necessary to build a watertight concrete cofferdam around the entire foundation.

When actual foundation work begins, Wall Streeters may be disappointed. They won't see much of it because all pile driving and other noisy work will be done at night when the financial district is almost deserted.

Turner Construction Co. is the general contractor.

Watch Your Language

Arizona plasterers are touchy about the common, non-construction use of the word, "plastered."

"Plastered, as a word to describe someone who has had too much to drink, has got to go," soberly declared the Arizona Lath and Plaster Institute.

The Institute started its campaign against what it considers misuse of the word by appealing to the publishers of Roget's Thesaurus to delete the word from its list of synonyms for "intoxicated."

Such a use of the word is disturbing to the professional pride of plasterers, the Institute announced.

And William F. Mitten, an Institute official, pointed out: "You don't say a person gets shingled, painted, or landscaped. Why say he gets plastered?"

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